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Andrew Fuller
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Hon.^m Francis⁹ Bacon⁹, Baro de Veru-
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Anno Dⁿⁱ. 1626. Annoq, Aet^{at} 66.



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S Y L V A
S Y L V A R U M:

O R,

A Natural History.

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IN TEN CENTURIES.

WHEREVNTO IS NEWLY ADDED
the History *Naturall* and *Experimentall* of
LIFE and DEATH, or of the
Prolongation of Life.

BOTH WRITTEN BY THE RIGHT HONOURABLE
FRANCIS *Bacon* LO. *Versham* Viscount St. ALBAN.

Published after the Authors Death,
By WILLIAM RAVVLEY Doctor in Divinity
one of his Majesties Chaplains.

Hereunto is now added an Alphabetical Table of the Principall
things contained in the ten *Centuries*.

The Seventh Edition.

L O N D O N,

Printed for *William Lee*, and are to be sold by *Thomas Williams* at the Bible in
Little-Britain, and *William Place* at *Grays-Inne Gate* in *Holburn*, 1658.

THE SYLVIA

SYLVIA

BY

MISS

ELIZABETH

IN

A NOVEL

IN THREE VOLUMES

WHEREIN IS CONTAINED

the History of Sylvia and her

Friendship with

Miss

BOTH WRITTEN BY THE AUTHOR

OF THE HISTORY OF

THE HISTORY OF

BY MISS

ELIZABETH

MISS

ELIZABETH

The Second Edition

LONDON

Printed for J. Dilly, in Pall-mall, by A. Millar, in Strand, and J. Bland, in St. Paul's Church-yard, 1749.

Printed for J. Dilly, in Pall-mall, by A. Millar, in Strand, and J. Bland, in St. Paul's Church-yard, 1749.

B12
1658



TO THE MOST HIGH
AND MIGHTY PRINCE

CHARLES,

BY THE GRACE OF GOD,
King of Great Britaine, France, and
Ireland, Defender of the Faith, &c.

May it please your Most Excellent Majesty;



He whole Body of the *Naturall History*, either designed or written, by the late *Lord Viscount S. Alban*, was dedicated to your Majesty, in his *Book De Ventis*, about four years past, when your Majesty was *Prince*: So as there needed no new Dedication of this *Worke*, but only in all humbleness, to let your Majesty know, it is yours. It is true; if that *Lord* had lived, your Majesty, ere long, had been invoked, to the Protection of another *History*, whereof, not *Natures Kingdom*, as in this, but these of your *Majesties*,

(during the Time and Raigne of King Henry the Eighth) had been the Subject; Which since it died under the Designation meereley, there is nothing left, but your *Majesties* Princely Goodness, graciously to accept of the Undertakers Heart, and Intentions; who was willing to have parted, for a while, with his Darling *Philosophie*, that he might have attended your Royall Commandement, in that other *Worke*. Thus much I have been bold in all lowliness to represent unto your *Majestie*, as one that was trusted with his *Lordships* *Writings*, even to the last. And as this *Worke* affecteth the *Stampe* of your *Majesties* Royall *Protection*, to make it more currant to the *World*; So under the *Protection* of this *Worke*, I presume in all humbleness to approach Your *Majesties* presence; And to offer it up into Your *Sacred Hands*.

Your *MAJESTIES* most Loyall

and Devoted Subject,

W. RAVVLEY.



To the Reader.

Having had the Honour to be continually with my Lord, in compiling of this *Worke*, And to be employed therein; I have thought it not amiss, (with His Lordships good leave and liking,) for the better satisfaction of those that shall read it, to make known somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say, that if he should have served the glory of his own Name, he had been better not to have published this *Natural History*: For it may seem an indigested Heap of Particulars, And cannot have that Lustre, which Books cast into Methods have. But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himself. And he knew well, that there was no other way open to unloose Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiving Notions, and Theories; and thereby made Impotent for Generation of Works; But onely no where to depart from the Sense, and clear Experience; But to keep close to it, especially in the beginning. Besides, this *Natural History* was a Debt of his, being designed and set down for a third part of the *Instauration*. I have also heard his Lordship discourse, that Men (no doubt) will think many of the *Experiments* contained in this Collection, to be Vulgar and Triviall: Mean and Sordid; Curious and Fruitless. And therefore he wisheth, and they would have perpetually before their Eyes, what is now in doing: And the difference between this *Natural History*, and others. For those *Natural Histories*, which are Extant, being gathered for De-
light

To the Reader.

light and Use, are full of pleasant Descriptions and Pictures; and affect and seek after Admiration, Rarities, and Secrets. But contrariwise, the Scope which his Lordship intendeth, is to write such a *Naturall History*, as may be Fundamentall to the Erecting and Building of a true *Philosophy*: For the Illumination of the *understanding*; the Extracting of *Axiomes*, and the producing of many Noble Works, and *Effects*. For he hopeth by this meanes, to acquit himself of that, for which he taketh *Himself* in a sort bound; And that is the Advancement of Learning and Sciences. For having in this present Work Collected the Materialls for the Building; and in his *Novum Organum* (of which his Lordship is yet to publish a Second Part) set down the Instruments and Directions for the Work; Men shall now be wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall Men is capable. And in this behalf, I have heard his Lordship speak complainingly; That his Lordship (who thinketh that he deserveth to be an Architect in this building) should be forced to be a Work-man, and a Labourer; And to dig the Clay, and burn the Brick; And more then that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burn the Bricks withall. For he knoweth, that except he doe it nothing will be done: Men are so set to despise the meanes of their own good. And as for the *Baseness* of many of the Experiments; As long as they be Gods Works, they are honourable enough. And for the *Vulgarness* of them; true *Axiomes* must be drawn from plain Experience. and not from doubtfull; And his Lordships course is to make Wonders Plain, and not Plain things Wonders; And that Experience likewise must be broken and grinded, and not whole, or as it groweth; And for *Use*, his Lordship hath often in his Mouth, the two kinds of Experiments, *Experimenta Frustrifera*, and *Experimenta Lucifera*: Experiments of Use, and Experiments of Light: And he reporteth himself, whether he were not a strange Man, that should think that light hath no Use, because it hath no Matter. Further his Lordship thought good also, to adde unto many of the Experiments themselves, some *Gloss* of the Causes, that in the succeeding Work of *Interpreting Nature*, and *Framing Axiomes*, all things may be in more readines. And for the Causes herein by him assigned; his Lordship perswadeth Himself, they are farre more certain, than those

To the Reader.

those that are rendred by Others; Not for any Excellency of his own Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with *Nature*; and *Experience*. He did consider likewise, that by this Addition of *Causes*, mens mindes (which make so much haste to find out the *Causes* of things;) would not think themselves utterly lott, in a vast wood of *Experience*, but stay upon these *Causes*, (such as they are) a little, till true *Axiomes* may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact *Method*, (though he that looketh attentively into them, shall find that they have a secret Order) was because he conceived that other men would now think that they could do the like. And so go on with a further Collection: which if the *Method* had been Exact, many would have despaired to attain by Imitation. As for his Lordships love of Order, I can referre any Man to his Lordships Latin Book, *De Augmentis Scientiarum*: which (if my Judgment be any thing) is written in the Exactest Order, that I know any Writing to be. I will conclude with an usuall speech of his Lordships. That this Work of his *Natural History*, is the *World*, as G O D made it, and not as men have made it: For that it hath nothing of Imagination.

This Epistle is the same, that should have been prefixed to this Book, if his Lordship had lived.

W. Rawley.

A

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<i>Of Heat under Earth.</i> Exp. 1	ibid.
<i>Of Flying in the Air.</i> Exp. 1	ibid.
<i>Of the Scarlet Dye.</i> Exp. 1	ibid.
<i>Of Maleficiating.</i> Exp. 1	pag. 192
<i>Of the Rise of Liquours, or Powders, by meanes of Flame.</i> Exp. 1	ibid.
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Century X.

O <i>F the Transmission and influx of Immaterial Vertues, and the Force of Imagination; whereof there be Experiments Monitory three; In all,</i> Exp. 11	pag. 197
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<i>Of Secret Vertues and Proprieties.</i> Exp. 1	pag. 215
<i>Of the Generall Sympathy of Mens Spirits.</i> Exp. 1	pag. 216

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An Exposition of the Prophesie of *Haggie* in 15 Sermons, by that Famous Divine *John Reynolds* D. D. in 4. 1649.

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There is lately printed for *W. Lee, D. Pakeman, L. W. Ric.* and others, An Epitome of all the Common and Statute-Laws of this Nation, now in force, by *W. Sheppard Esq*: Published by his Highness speciall Command. 1646

NATURALL.



NATURALL HISTORY.

I. Century.

Digge a Pit upon the *Sea-shore*, somewhat above the High-water Mark, and sink it as deep as the Low-water Mark; And as the *Tide* cometh in, it will fill with *Water*, Fresh and Potable. This is commonly practised upon the Coast of *Babary*, where other fresh *Water* is wanting. And *Cesar* knew this well, when he was besieged in *Alexandria*: For by digging of *Pits* in the *Sea-shore*, he did frustrate the Laborious Workes of the Enemies, which had turued the *Sea-water* upon the Wells of *Alexandria*; And so saved his Army, being then in Desperation. But *Cesar* mistook the Cause; For he thought that all *Sea-sands* had Naturall Springs of *Fresh-Water*. But it is plain, that it is the *Sea-water*; because the Pit filleth according to the Measure of the *Tide*: And the *Sea-water* passing or Straining through the Sands, leaveth the Saltnefs.

I remember to have read, that Triall hath been made of *Salt-water* passed through *Earth*; through ten Vessels, one within another, and yet it hath not lost his Saltnefs, as to become potable: But the same Man saith, that (by the Relation of Another) *Salt-water* drayned through twenty Vessels, hath become Fresh. This *Experiment* seemeth to cross that other of *Pits*, made by the *Sea-side*; and yet but in part, if it be true, that twenty Repetitions do the effect. But it is worth the Note, how poor the Imitations of Nature are, in common course of *Experiments*, except they be led by great Judgement, and some good Light of *Axiomes*. For first, there is no small difference between a Passage of *Water* through twenty small Vessels; And through such a distance, as between the Low-water and High-water Mark. Secondly, there is a great difference between Earth and Sand. For all Earth hath in it a kind of Nitrous Salt, from which Sand is more free; And besides, Earth doth not strain the *Water* so finely, as Sand doth. But there is a third Point, that I suspect as much, or more than the other Two; And that is, that in the *experiment* of *Transmission* of the *Sea-water* into the *Pits*, the *Water* riseth; But in the *experiment* of transmission of the *Water* through the Vessels, it falleth: Now certain it is, that the Salter part of *Water*, (once

Experiments in Consort, touching the Straining and Passing of Bodies, one thorrow another: which they call Percolation.

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Salted throughout) goeth to the Bottome. And therefore no marvell, if the Drayning of *water* by descent, doth make it fresh: Besides, I do somewhat doubt, that the very Dashing of the *water*, that cometh from the Sea, is more proper to strike off the Salt part, than where the *water* slideth of her own Motion.

It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*) is a good kind of *Separation*, Not only of Thick from Thin, and Gross from Fine; But of more subtile Natures; And varieth according to the Body through which the *Transmission* is made. As if through a woollen Bag, the Liquor leaveth the Fatness; If through Sand, the Saltness, &c. They speak of Severing Wine from Water; passing it through Ivie wood, or through other the like porous Body; but *Non constat*.

The *Gum* of *Trees* (which we see to be commonly shining and clear) is but a fine Passage or *straining* of the Juice of the Tree, through the Wood and Bark. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent than *Gums*) are the fine Exudations of *Stone*.

Aristotle giveth the Cause, vainly, why the *Feathers* of *Birds* are of more lively Colours, than the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Green *Haire*. He saith, it is, because *Birds* are more in the Beames of the Sun, than *Beasts*; but that is manifestly untrue; For *Cattle* are more in the Sun than *Birds*, that live commonly in the Woods, or in some Covert. The true Cause is, that the excrementitious Moisture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, than it doth in *Beasts*: For *Feathers* pass through Quills, And *Haire* through Skin.

The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleaving Body is Mixed and Agitated with the *Liquors*; whereby the grosser Part of the *Liquor* sticks to that Cleaving Body; And so the finer Parts are freed from the Grossier. So the *Apothecaries* clarify their *Syrups* by whites of Eggs, beaten with the Juices which they would clarify; which whites of Eggs gather all the Dregs and grossier Parts of the Juice to them; And after the *Syrup* being set on the Fire, the whites of Eggs themselves harden, and are taken forth. So *Ippocras* is clarified by mixing with Milk; And stirring it about, And then passing it through a Woollen Bag, which they call *Hippocrates Sleeve*, And the Cleaving Nature of the Milk draweth the Powder of the Spices, and grossier parts of the *Liquor* to it; and in the passage they stick upon the Woollen bag.

The *Clarifying* of *Water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *water* is Crystalline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *water* may strain through them.

It may be, *Percolation* doth not only cause Clearness and Splendour, but Sweetness of Savour; For that also followeth, as well as Clearness, when the Finer Parts are severed from the Grossier. So it is found, that the Sweats of Men that have much Heat, and exercise much, and have clean Bodies, and fine Skins, do smell sweet; As was said of *Alexander*; And we see, commonly, that *Gums* have sweet Odours.

Take a *Glass*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the *Glass*, pressing it somewhat hard; And after you have drawn it some few times about, it will make the *Water* friske

and

and sprinkle up, in a fine Dew. This Instance doth excellently Demonstrate the Force of *Compreffion* in a Solid Bodie. For whensoever a Solid Body (as Wood, Stone, Metall, &c.) is pressed, there is an inward Tumult in the parts thereof; seeking to deliver themselves from the *Compreffion*: And this is the Cause of all *Violent Motion*. Wherein it is strange in the highest Degree, that this *Motion* hath never been observed, nor enquired. It being of all *Motions*, the most Common, and the Chief Root of all *Mechanicall Operations*. This *Motion* worketh in round at first, by way of Proof, and Search; which way to deliver it self; And then worketh in Progress, where it findeth the Deliverance easiest. In *Liquors* this *Motion* is visible: For all *Liquors* stricken make round Circles, and withall Dash; but in *Solids* (which break not) it is so subtile, as it is invisible: but nevertheless bewrayeth it self by many effects; as in this Instance whereof we speak. For the *Pressure* of the Finger furthered by the wetting; (because it sticketh so much the better unto the Lip of the *Glass*) after some continuance, putteth all the small Parts of the *Glass* into work; that they strike the *Water* sharply, from which *Percussion* that Sprinkling cometh.

If you strike or pierce a *Solid Body*, that is Brittle, as *Glass*, or *Suger*, it breaketh not only, where the immediate force is; but breaketh all about into shivers and fitters; The *Motion*, upon the *Pressure*, searching all wayes, and breaking where it findeth the *Body* weakest.

The *Powder* in *Shot* being Dilated into such a *Flame*, as endureth not *Compreffion*, Moveth likewise in round (the *Flame* being in the Nature of a *liquid Body*;) Sometimes recoyling, Sometimes breaking the *Picce*; But generally discharging the *Bullet*, because there it findeth easiest Deliverance.

This *Motion* upon *Pressure*, and the Reciprocall thereof, which is *Motion* upon *Tensure*; we use to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or *Dimension*, delivereth and restoreth it self to the *Naturall*: As when a *Blown Bladder* (Pressed) riseth again; or when *Leather* or *Cloth* tentured spring back. These two *Motions* (of which there be infinite Instances) we shall handle in due place.

This *Motion* upon *Pressure* is excellently also demonstrated in *Sounds*; As when one Chimeth upon a *Bell*, it foundeth; But as soon as he layeth his hand upon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall String*, as soon as the Quill of the Jack falleth from it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts of the *Bell*, or *String*, upon the *Air*; All one, as the *Water* is caused to leap by the subtile Percussion of the Minute parts of the *Glass*, upon the *Water*, whereof we spake a little before in the ninth *Experiment*. For you must not take it to be, the locall *shaking* of the *Bell*, or *String* that doth it. As we shall fully declare, when we come hereafter to handle *Sounds*.

TAke a *Glass* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take also another *Glass*, whereinto put *Claret Wine* and *Water* mingled; Reverse the first *Glass*, with the *Belly* upwards, Stopping the *Neb* with your finger; Then dip the Mouth of it within the Second *Glass*, and remove your Finger: Continue it in that posture for a time; And it will unminge the *Wine* from the *Water*: The *Wine* ascending and setting in the top of the upper *Glass*; And the *Water* descending and setting in the bottome of the lower *Glass*. The passage is apparent to the Eye; For

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Experiments in Confort touching Separations of Bodies by Weighr.

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you shall see the *Wine*, as it were, in a small vein, rising through the *Water*. For handfomness sake (because the Working requireth some small time) it were good you hang the upper *Glass* upon a Nail. But as soon as there is gathered so much pure and unmixed *Water* in the Bottome of the Lower *Glass*, as that the Mouth of the Upper *Glass* dippeth into it, the *Motion* ceaseth.

15 Let the Upper *Glass* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Upper *Glass* be *Water* pure, the Lower *Water* coloured, or contrariwise, there followeth no *Motion* at all. But it hath been tried, that though the Mixture of *Wine* and *Water*, in the Lower *Glass*, be three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This *Separation* of *Water* and *Wine* appeareth to be made by *Weight*; for it must be of *Bodies* of unequall *Weight*, or else it worketh not; And the Heavier *Body* must ever be in the upper *Glass*. But then note withall, that the *Water* being made pensible, and there being a great *Weight* of *Water* in the *Belly* of the *Glass*, sustained by a small *Pillar* of *Water* in the *Neck* of the *Glass*; It is that, which setteth the *Motion* on work: For *Water* and *Wine* in one *Glass*, with long standing, will hardly sever.

16 This *Experiment* would be Extended from Mixtures of severall *Liquors*, to *Simple Bodies*, which Consist of severall Similiar Parts: Try it therefore with *Broyn* or *Salt-water*, and *Fresh-water*: Placing the *Salt-water* (which is the heavier) in the upper *Glass*; And see whether the *Fresh* will come above. Try it also with *Water thick Sugred*, and *Pure Water*, and see whether the *Water* which cometh above, will loose his Sweetness: For which purpose it were good there were a little *Cock* made in the *Belly* of the upper *Glass*.

Experiments
in Consort
touching Ju-
dicious and
Accurate In-
fusions, both in
Liquors, and
Air.

IN *Bodies* containing Fine *Spirits*, which do easily dissipate, when you make *Infusions*, the Rule is; A short Stay of the *Body* in the *Liquor* receiveth the Spirit; And a longer Stay confoundeth it; because it draweth forth the Earthy Part withall, which embaseth the finer. And therefore it is an Error in *Physitians*, to rest simply upon the Length of Stay, for encreasing the vertue. But if you will have the *Infusion* strong, in those kind of *Bodies* which have fine *Spirits*, your way is, not to give Longer time, but to repeat the *Infusion* of the *Body* oftner. Take *Violets*, and infuse a good Pugill of them in a Quart of *Vineger*; Let them stay three quarters of an hour, and take them forth; And refresh the *Infusion* with like quantity of new *Violets*, seven times; And it will make a *Vineger* so fresh of the *Flower*, as if a Twelve moneth after, it be brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the *Flower*, a good while after, than at first.

18 This Rule, which we have given, is of singular use, for the Preparations of *Medicines*, and other *Infusions*. As for Example; the Leaf of *Burrage* hath an Excellent Spirit, to repress the fuliginous Vapour of Dusky Melancholy, and so to cure Madnes: But nevertheless, if the Leaf be infused long, it yeildeth forth but a raw substance, of no Vertue: Therefore I suppose, that if in the Must of *Wine*, or Wort of Beer, while it worketh, before it be Tunned, the *Burrage* stay a small time, and be often changed with fresh; It will make a Sovereign Drink for Melancholy Passions. And the like I conceive of *Orange-Flowers*,

19 *Rubarb* hath manifestly in it Parts of contrary Operations: Parts that purge, and parts that bind the body; and the first lay looser, and the latter lay deeper:

deeper : So that if you infuse *Rubarb* for an hour, and crush it well, it will purge better, and bind the Body less after the purging, than if it stood twenty four houres ; This is tried, But I conceive likewise, that by Repeating the *Infusion* of *Rubarb*, severall times, (as was said of *Violets*) letting each stay in but a small time ; you may make it as strong a *Purging Medicine*, as *Scammony*. And it is not a small thing won in *Physick*, if you can make *Rubarb*, and other *Medicines* that are *Benedict*, as strong Purgers, as those that are not without some Malignity.

Purging Medicines, for the most part, have their *Purgative* Vertue, in a fine Spirit ; As appeareth by that they endure not boyling, without much loss of vertue. And therefore it is of good use in *Physick*, if you can retain the *Purging* of Vertue, and take away the Unpleasant tast of the *Purger*, which it is like you may do, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Tast, is in the Groffer part.

Generally, the working by *Infusions*, is gross and blind, except you first trie the Issuing of the severall Parts of the Body, which of them Issue more speedily, and which more slowly ; And so by apportioning the time, can take and leave that Quality, which you desire. This to know, there be two wayes ; The one to trie what long stay, and what short stay worketh, as hath been said : The other to trie in Order, the succeeding *Infusions*, of one and the same Body, successively, in severall *Liquors*. As for example, Take *Orenge-Pils*, or *Rose-Mary*, or *Cinnamon*, or what you will ; And let them *Infuse* half an hour in *Water* : Then take them out : and *Infuse* them again in other *Water* ; And so the third time : And then tast and consider the *First Water*, the *Second*, and the *Third* : And you will find them differing, not only in Strength and Weakness, but otherwise in Tast, or Odour ; For it may be the *First water* will have more of the Sent, as more Fragrant ; And the *Second* more of the Tast, as more bitter or Biting, &c.

Infusions in *Air*, (for so we may call *Odours*) have the same diversities with *Infusions* in *Water* ; In that the severall *Odours* (which are in one Flower, or other Body) issue at severall times ; Some earlier, some later : So we find that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleasing Sent, that cometh forth first ; But soon after an ill Sent quite differing from the Former. Which is caused, not so much by Mellowing, as by the late Issuing of the Groffer Spirit.

As we may desire to extract the finest Spirits in some Cases ; So we may desire also to discharge them (as hurtfull) in some other. So *Wine burnt*, by reason of the Evaporating of the finer Spirit, enflameth less, and is best in Agues : *Opium* leeseeth some of his poysonous Quality, if it be vapoured out, mingled with *Spirit of Wine*, or the like : *Sean* leeseeth somewhat of his windiness by Decocting ; And (generally) subtile or windy Spirits are taken off by Incension, or Evaporation. And even in *Infusions* in things that are of too high a Spirit, you were better pour off the first *Infusion*, after a small time, and use the latter.

Bubbles are in the forme of an *Hemisphere* ; *Air* within, and a little Skin of *Water* without : And it seemeth somewhat strange, that the *Air* should rise so swiftly, while it is in the *Water* ; And when it cometh to the top, should be stayed by so weak a Cover as that of the *Bubble* is. But as for the swift Ascent of the *Air*, while it is under the *Water*, that is a *Motion* of *Percussion* from the *Water*, which it self descending, driveth up the *Air* ; and no *Motion* of *Lewity* in the *Air*. And this *Democritus*

Experiment Solitary, touching the Appetite of Continuation in Liquids.

24

called *Motus Plaga*. In this Common *Experiment*, the Cause of the Enclosure of the *Bubble* is for that the Appetite to resist Separation, or Discontinuance, (which in solid *Bodies* is strong) is also in *Liquors*, though fainter and weaker; As we see in this of the *Bubble*: we see it also in little Glasses of Spittle that Children make of Rushes; And in Castles of Bubbles, which they make by blowing into *water*, having obtained a little Degree of Tenacity by Mixture of Soap: We see it also in the *Stillicides* of *water*, which if there be *water* enough to follow, will Draw themselves into a small thred, because they will discontinue; But if there be no Remedy, then they cast themselves into round Drops; which is the Figure, that saveth the Body most from Discontinuance: The same Reason is of the Roundness of the *Bubble*, as well for the Skin of *Water*, as for the *Air* within: For the *Air* likewise avoideth *Discontinuance*; And therefore casteth it self into a round Figure. And for the stop and Arrest of the *Air* a little while, it sheweth that the *Air* of it self hath little, or no Appetite, of Ascending.

Experiment
Solitary, touch-
ing the making of
Artificial Springs.

25

THE Rejection, which I continually use, of *Experiments*, (though it appeareth not) is infinite; But yet if an *Experiment* be probable in the Work, and of great Use, I receive it, but deliver it as doubtful. It was reported by a Sober Man, that an *Artificial Spring* may be made thus: Find out a hanging Ground, where there is a good quick Fall of Rain-water. Lay a Half-Trough of Stone, of a good length, three or four foot deep within the same Ground; with one end upon the high Ground, the other upon the low: Cover the Trough with Brakes a good thickness, and cast Sand upon the Top of the Brakes: You shall see, (saith he) that after some showres are past, the lower end of the Trough will be like a *Spring* of *water*: which is no marvell, if it hold, while the Rain-water lasteth; But he said it would continue long time after the Rain is past: As if the water did multiply it self upon the Air, by the help of the Coldness and Condensation of the Earth, and the Consort of the first Water.

Experiment
Solitary touch-
ing the Venomous
Quality of *Mans Flesh*.

26

THE *French*, (which put off the Name of the *French Disease*, unto the Name of the *Disease of Naples*) do report, that at the Siege of *Naples*, there were certain wicked Merchants that Barrelled up *Mans flesh*, (of some that had been lately slain in *Barbary*) and sold it for *Tunney*; And that upon that foul and high Nourishment, was the Originall of that *Disease*. Which may well be; For that it is certain, that the *Caniballs* in the *West-Indies*, eat *Mans flesh*; And the *West-Indies* were full of the Pocks when they were first discovered: And at this day the *Mortalest poysons*, practised by the *West-Indians*, have some Mixture of the Blood, or Fat, or Fleth of *Man*: And divers Witches, and Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, have fed upon *Mans flesh*, to aid (as it seemeth) their Imagination, with high and foul Vapours.

Experiment
Solitary, touch-
ing the Ver-
sion and Trans-
mutation of
Air into *Wa-
ter*.

27

IT seemeth that there be these wayes (in likelyhood) of *Version* of *Vapours* or *Air*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly Condense; as we see in the *Contracting* of the *Air* in the *Weather-Glass*; whereby it is a Degree nearer to *Water*. We see it also in the *Generation* of *Springs*, which the *Ancients* thought (very probably) to be made by the *Version* of *Air* into *Water*, holpen by the *Rest*, which the *Air* hath in those Parts; whereby it cannot dissipate. And by the *Coldness* of *Rocks*; for there

there *Springs* are chiefly generated. We see it also in the *Effects* of the *Cold* of the *Middle Region* (as they call it) of the *Air*; which produceth *Dewes*, and *Raines*. And the Experiment of Turning *Water* into *Ice*, by *Snow*, *Nitre*, and *Salt*, (whereof we shall speak hereafter) would be transferred to the Turning of *Air* into *Water*. The Second way is by *Compressiōn*; As in *Stillatories*, where the Vapour is turned back, upon it self, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* upon the Covers of *Boyling Pots*. And in the *Dew* towards *Rain*, upon *Marble*, and *Wainscot*. But this is like to do no great effect; Except it be upon Vapours, and gross *Air*, that are already very near in Degree to *Water*. The Third is that, which may be searched into, but doth not yet appear; which is, by *Mingling* of moist Vapours with *Air*; And trying if they will not bring a Return of more *water*, than the *Water* was at first: For if so; That Increase is a *Versiō* of the *Air*: Therefore put *Water* into the Bottome of a *Stillatory*, with the *Neb* stopped; Weigh the *Water* first; Hang in the Middle of the *Stillatory* a large *Spunge*; And see what Quantity of *Water* you can crush out of it; And what it is more, or less, compared with the *Water* spent; for you must understand, that if any *Versiō* can be wrought, it will be easiest done in small Pores: And that is the Reason why we prescribe a *Spunge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receivng* the *Air* into the small Pores of *Bodies*; For (as hath been said) every thing in small Quantity is more easie for *versiō*; And Tangible Bodies have no pleasure in the comfort of *Air*, but endeavour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Air* should Condense, there is nothing to succeed: Therefore it must be in *loose Bodies*, as *Sand*, and *Powder*, which we see, if they lie close, of themselves gather Moisture.

It is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put young, into such a *Cage*, or *Box*, as they cannot rise to their Stature, but may increase in Breadth, or Length, will grow accordingly, as they can get Roome: which if it be true, and faisible, and that the young *Creature* is pressed, and straightned, doth not thereupon die; It is a Means to produce *Dwarf Creatures*, and in a very Strange figure. This is certain, and noted long since; That the Pressure or Forming of Parts of *Creatures*, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of *Infants*, between the Hands, was noted of Old, to make *Macrocephali*; which shape of the Head, at that time, was esteemed. And the Raising gently of the Bridge of the Nose, doth prevent the Deformity of a *Saddle Nose*. Which observation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kinds, more comely and better featured, than otherwise they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Legs, to keep them from falling down too low; And by Stroaking up the Forehead to keep them from being low foreheaded. And it is a common Practice to swathe *Infants*, that they may grow more straight, and better shaped: And we see *Young Women*, by wearing straight Bodies, keep themselves from being Gross and Corpulent.

Experiment Solitary, touching Helps towards the Beauty & good Features of Persons.

28

Experiment Solitary, touching the Condensing of Air in such sort as it may put on Weight, & yield Nourishment.

29

Onions, as they hang, will many of them shoot forth; and so will *Pennyroyall*; and so will an Herb called *Orpin*; with which they use, in the Countrey, to trim their Houses, binding it to a Lath, or Stick, and setting it against a wall. We see it likewise, more especially, in the greater

Semper-

Semper-vive, which will put out Branches, two or three yeares: But it is true, that commonly they wrap the Root in a Cloth befieared with *Oyl*: and renew it once in half a Year. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is; For that these *Plants* have a Strong, Dense, and Succulent Moisture, which is not apt to exhale; And so is able, from the old store, without drawing help from the Earth, to suffice the sprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Summer; which are the Times of Putting forth. We see also, that *Stumps of Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to trie whether these things, in the Sprouting, do encrease *Weight*; which must be tried, by weighing them before they be hang'd up; And afterwards again, when they are sprouted. For if they encrease not in *Weight*; Then it is no more but this; That what they send forth in the Sprout, they leese in some other Part: But if they gather *Weight*, then it is *Magnale Natura*; For it sheweth, that *Air* may be made so to be Condensed, as to be converted into a *Dense Body*; whereas the Race and Period of all things, here above the Earth, is to extenuate and turn things to be more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also that *Air* can *Nourish*; which is another great Matter of Consequence. Note, that to trie this, the *Experiment* of the *Semper-vive*, must be made without Oyling the Cloth; For else, it may be, the *Plant* receiveth Nourishment from the *Oyl*.

Experiment
Solitary, touch-
ing the
Commixure of
Flame & *Air*
and the great
Force thereof.

30

F*lame* and *Air* do not Mingle, except it be in an *Instant*; Or in the *vital Spirits of Vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath been ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus farre it is true. And then (forsooth) it is become another Element; the Forme whereof occupieth more place; And so, of Necessity, followeth a Dilatation: And therefore, lest two Bodies should be in one place, there must needs also follow an Expulsion of the Pellet; Or blowing up of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing else except it were in a very great quantity, will be suffocate with any hard Body, such as a Pellet is; Or the Barrell of a Gun: So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or tspread. But the Cause of this so potent a Motion, is the *Nitre*, (which we call otherwise *Salt-Petre*) which having in it a notable Crude and windy *Spirit*, first by the *Heat* of the *Fire* suddenly dilateth it self; (and we know that simple *Air*, being preternaturally attenuated by *Heat*, will make it self Room, and break, and blow up that which resisteth it.) And secondly, when the *Nitre* hath dilated it self, it bloweth abroad the *Flame* as an inward Bellows. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *Wild-fire*, and divers other Inflammable Matters, though they burn cruelly, and are hard to quench, Yet they make no such fiery wind, as *Gunpowder* doth: And on the other side, we see that *Quick-silver* (which is a most Crude and Watry Body) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certain, their *Vital Spirits* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Air* and *Flame* being free, will not well mingle, yet bound in by a *Body* that hath some fixing, they will. For that you may best see in, those two Bodies, (which are their *Aliments*) *Water*, and *Oyl*; For they likewise will not well mingle of themselves, but in the Bodies of *Plants*,
and

and *Living Creatures*, they will. It is no marvell therefore, that a small *Quantity of Spirits*, in the Cels of the Brain, and Cannals of the Sinews, are able to move a whole Body, (which is of so great Mass) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnes, as in playing Division upon the *Lute*. Such is the force of these two Natures, *Air* and *Flame* when they incorporate.

TAke a small *Wax Candle*, and put it in a Socket, of Brass, or Iron; Then set it upright in a Porringer full of *Spirit of Wine*, heated: Then set both the *Candle*, and *Spirit of Wine*, on fire, and you shall see the *Flame* of the *Candle*, open it self, and become four or five times bigger than otherwise it would have been; and appear in Figure *Globular*, and not in *Pyramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blew towards the Colour of the Outward *Flame* of the *Spirit of Wine*. This is a Noble *Instance*, wherein two things are most remarkable, The one, that one *Flame* within another quencth not, but is a fixed Body, and continueth as *Air*, or *Water* do. And therefore *Flame* would still ascend upwards in one greatnes, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Air* doth with *Air*, or *Water* with *Water*, but only remaineth contiguous; As it cometh to pass betwixt Consisting Bodies. It appeareth also, that the forme of a *Pyramis* in *Flame*, which we usually see, is merely by Accident, and that the *Air* about, by quenching the *Sides* of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it self it would be Round: And therefore *Smoak* is in the Figure of a *Pyramis* Reversed; For the *air* quencth the *Flame*, and receiveth the *Smoak*. Note also, that the *Flame* of the *Candle* within the *Flame* of the *Spirit of Wine*, is troubled; And doth not only open and move upwards, but moveth waving, and to and fro: As if *Flame* of his own Nature (if it were not quenched) would rowl and turn, as well as move upwards. By all which it should seem, that the Celestiall Bodies, (most of them) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all *Globular*, and Determinate, They have Rotation, And they have the Colour and Splendour of *Flame*: So that *Flame* above is Durable, and Consistent, and in his Naturall place; But with us, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

TAke an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it cometh forth, you shall find those Parts of the *Arrow*, which were one the Outfides of the *Flame*, more burned, blacked, and turned almost into a Coal; whereas that in the Midst of the *Flame*, will be, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discovery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the *Sides*, than in the Midst: And, which is more; that *Heat* or *Fire* is not violent or furious, but where it is checked and pent. And therefore the *Peripateticks* (howsoever their opinion of an *Element* of *Fire* above the *Air* is justly exploded) in that Point they acquit themselves well: For being opposed, that if there were a *Sphere* of *Fire*, that encompassed the Earth so near hand, it were impossible but all things should be burnt up, They answer, that the pure *Elementall Fire*, in his own place, and not irritate, is but of a Moderate *Heat*.

Experiment
Solitary, touching the Secret Nature of
Flame.

31

Experiment
Solitary, touching the Different force of
Flame in the Midst and on the Sides.

32

Experiment Solitary, touching the Decree of the Natural motion of Gravity in great distance from the Earth; or within some depth of the Earth.

33

Experiment Solitary, touching the Contraction of Bodies in Bulk, by the Mixture of the more Liquid Body with the more Solid.

34

Experiment Solitary, touching the Making Vines more fruitful.

35

Experiments in Confort touching Purging Medicines.

36

IT is affirmed constantly by many, as an usuall Experiment, That a Lump of Ure, in the Bottom of a Mine, will be tumbled, and stirred by two Mens strength; which if you bring it to the Top of the Earth, will ask six Mens strength at the least to stirre it. It is a Noble Instance, and is fit to be tryed to the full: For it is very probable, that the Motion of Gravity worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Union of Dense Bodies with the Earth, in respect of the distance, is more dull: The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Moving to a Point or Place (which was the Opinion of the Ancients) it is a meer Vanity,

IT is strange, how the Ancients took up Experiments upon credit, and yet did build great Matters upon them. The Observation of some of the best of them, delivered confidently, is, That a Vessel filled with Ashes, will receive the like quantity of Water, that it would have done, if it had been empty. But this is utterly untrue, for the Water will not go in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the Ashes; As we see that Ashes alone, if they be hard prested, will lie in less room: And so the Ashes with Air between, lie looser; and with Water closer. For I have not yet found certainly, that the Water, it self, by mixture of Ashes, or Dust, will shrink or draw into less Roome.

IT is reported of credit, that if you lay good store of Kernels of Grapes, about the Root of a Vine, it will make the Vine come earlier and proper better. It may be tryed with other Kernels, laid about the Root of a Plant of the same kind; As Figs, Kernels of Apples, &c. The Cause may be, for that the Kernels draw out of the Earth Juice fit to nourish the Tree, as those that would be Trees of themselves, though there were no Root; But the Root being of greater strength, robbeth and devoureth the Nourishment, when they have drawn it: As great Fishes devoure little.

THE Operation of Purging Medicines, and the Causes thereof, have been thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a Hidden Propriety, a Specificall Vertue, and a Fourth Quality, and the like Shifts of Ignorance. The Causes of Purging are divers; all plain and perspicuous, and throughly maintained by Experience. The first is, That whatsoever cannot be overcome and digested by the Stomack, is by the Stomack, either put up by Vomit, or put down to the Guts; And by that Motion of Expulsion in the Stomack, and Guts, other Parts of the Body (as the Orifices of the Veins, and the like) are moved to expell by Consent. For nothing is more frequent than Motion of Consent in the Body of Man. This Surcharge of the Stomack, is caused either by the Quality of the Medicine, or by the Quantity. The Qualities are three: Extreme Bitter, as in Aloes, Coloquintida, &c. Loathsome and of horrible tast; As in Agarick, Black Hellebore, &c. And of secret Malignity, and disagreement towards Mans Body, many times not appearing much in the Tast; As in Scammony, Mechoacham, Antimony, &c. And note well, that if there be any Medicine that Purgeth, and hath neither of the first two Manifest Qualities; it is to be held suspected as a kind of Poyson; For that it worketh either by Corrosion, or by a secret Malignity, and Enmity to Nature: And therefore such Medicines are warily to be prepared, and used. The Quantity of that which is taken, doth also cause Purging; As we see in a great Quantity of New Milk from the Cow; yea and a great Quantity of Meat; For

Surfeits

Surfers many times turn to *Purges*, both upwards, and downwards. Therefore we see generally, that the working of *Purging Medicines* cometh two or three houres after the *Medicines* taken; For that the *Stomack* first maketh a proof, whether it can concoct them. And the like happeneth after *Surfers*; Or *Milk* in too great quantity.

A second Cause is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seen, that *Salt*, or any such thing that is sharp and biting, put into the *Fundament*, doth provoke the part to expell; And *Mustard* provoketh *Sneezing*: And any sharp Thing to the *Eyes* provoketh *Tears*. And therefore we see that almost all *Purgers* have a kind of *Twiching* and *wellication*, besides the *griping* which cometh of wind. And if this *mordication* be in an over-high Degree, it is little better than the *corrosion* of *poysen*; And it cometh to pass sometimes in *Antimony*; Especially if it be given to bodies not repleat with *Humours*; for where *Humours* abound, the *Humours* save the *Parts*.

The third Cause is *Attraction*: For I do not deny but that *purging Medicines* have in them a direct Force of *Attraction*; As *Drawing Plasters* have in *Surgery*: And we see *Sage*, or *Betony bruised*, *sneezing-powder*, and other *powders* or *Liquors* (which the *Physicians* call *Errhines*) put into the *Nose*, draw *Flegme*, and water from the *Head*; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the *Rhume* down by the *Palat*. And by this *Vertue*, no doubt, some *Purgers* draw more one *Humour*, and some another, according to the opinion received: As *Rubarb* draweth *Choler*; *Sean Melancholy*; *Agarick Flegme*, &c. But yet, (more or less) they draw promiscuously. And note also, that besides *Sympathy*, between the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some *Humour* more than another. And it is; for that some *Medicines* work quicker than others: And they that draw quick, draw only the *Lighter*, and more *fluide* *Humours*; they that draw slow, work upon the more *Tough*, and *Viscous* *Humours*. And therefore *Men* must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh only the *Lightest* part of the *Humour* away, and leaveth the *Mass* of *Humours* more obstinate. And the like may be said of *Worme-wood*: which is so much magnified.

The fourth Cause is *Flatulosity*: For wind stirred moveth to expell: And we find that (in effect) all *Purgers* have in them a raw *Spirit*, or *Wind*; which is the principall Cause of *Tortion* in the *Stomack*, and *Belly*. And therefore *Purgers* leese (most of them) the *vertue*, by *Decoction* upon the *Fire*; And for that Cause are chiefly given in *Infusion*, *Juyce*, or *Powder*.

The fifth Cause is *Compression*, or *Crushing*: As when *Water* is *Crushed* out of a *sponge*: So we see that *Taking Cold* moveth looseness by *Contraction* of the *skin*, and *outward Parts*; And so doth *Cold* likewise cause *Rheumes*, and *Defluxions* from the *Head*; And some *Astringent Plasters* crush out *purulent Matter*. This kind of *Operation* is not found in many *Medicines*: *Mirabolanes* have it; And it may be the *Barkes of Peaches*; For this *Vertue* requireth an *Astriction*; but such an *Astriction*, as is not carefultull to the *Body* (For a pleasing *Astriction* doth rather *Bind* in the *Humours*, than *Expell* them:) And therefore such *Astriction* is found in *Things* of an *Harsh* *Tast*.

The Sixth Cause is *Lubrefaction*, and *Relaxation*: As we see in *Medicines Emollient*; Such as are *Milk*, *Honey*, *Mallows*, *Lettuce*, *Mercuriall*, *Pellitory of the Wall*, and others. There is also a secret *vertue* of *Relaxation* in *Cold*: For the *heat* of the *Body* bindeth the *Parts* and *Humours* together, which

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Cold,

Cold, relaxeth: As it is seen in *Urine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, Break, and dissolve. And by this kind of *Relaxation*, *Fear* looseth the *Belly*; because the Heat retiring inwards towards the *Heart*, the *Guts* and other *Parts* are relaxed; In the same manner as *Fear* also causeth *Trembling* in the *Sinewes*. And of this Kind of *Purgers* are some *Medicines* made of *Mercury*.

42 The Seventh Cause is *Absterſion*; which is plainly a *Scouring off*, or *Incision* of the more *viscous Humors*, and making the *Humours* more *fluid*; And *Cutting* between them, and the *Part*. As is found in *Nitrous Water*, which scoureth *Linnen Cloth* (speedily) from the *Foulness*. But this *Incision* must be by a *Sharpness*, without *Astriction*: which we find in *Salt*, *Wormewood*, *Oxymel*, and the like.

43 There be *Medicines*, that move *Stooles*, and not *Urine*; Some other *Urine*, and not *Stooles*. Those that *Purge by Stool*, are such as enter not at all, or little into the *Mesentery veines*; But either at the first are not digestible by the *Stomack*, and therefore move immediately downwards to the *Guts*; Or else are afterwards rejected by the *Mesentery Veines*, and so turn likewise downwards to the *Guts*; and of these two kinds are most *Purgers*. But those that move *Urine*, are such as are well digested of the *Stomack*, and well received also of the *Mesentery veines*; so they come as far as the *Liver*, which sendeth *Urine* to the *Bladder*, as the *Whey of Bloud*: And those *Medicines* being *Opening* and *Piercing*, do fortifie the *Operation* of the *Liver*, in sending down the *wheyey Part* of the *Bloud* to the *Reines*. For *Medicines Urinative* do not work by *Rejection*, and *Indigestion*, as *Solutive* do.

44 There be divers *Medicines*, which in greater *Quantity*, move *Stool*, and in smaller, *Urine*: And so contrariwise, some that in greater *Quantity*, move *Urine*, and in smaller, *Stool*. Of the former sort is *Rubarb*, and some others. The Cause is, for that *Rubarb* is a *Medicine*, which the *Stomack* in a small *Quantity* doth digest, and overcome, (being not *Flatuous*, nor *Loathsome*;) and so sendeth it to the *Mesentery veines*; And so being *opening*, it helpeth down *Urine*: But in a greater *Quantity*, the *Stomack* cannot overcome it, and so it goeth to the *Guts*. *Pepper* by some of the *Ancients* is noted to be of the second sort; which being in small *Quantity*, moveth *wind* in the *Stomack* or *Guts*, and so expelled by *Stool*; But being in greater *Quantity*, dissipateth the *Wind*; And it self getteth to the *Mesentery veines*; And so to the *Liver*, and *Reines*; where, by *Heating* and *Opening*, it sendeth down *Urine* more plentifully.

Experiments
in confort touch-
ing Meats &
Drinks that are
most nourishing.

45

WE have spoken of *Evacuating* of the *Body*, we will now speak something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one part that is more *Nourishing* than another; As *Graines* and *Roots* nourish more, than the *Leaves*; inasmuch as the *Order* of the *Foliatanes* was put down by the *Pope*, as finding *Leaves* unable to *Nourish Mans Body*. Whether there be that difference in the *Flesh* of *Living Creatures*, is not well enquired: As whether *Livers*, and other *Entrails*, be not more *Nourishing*, than the *Outward Flesh*. We find that amongst the *Romans*, a *Goose's Liver* was a great delicacy; Inasmuch as they had *Artificiall* means to make it fair, and great; But whether it were more *Nourishing*, appeareth not. It is certain, that *Marrow* is more *Nourishing* than *Fat*. And I conceive that some *Decoction* of *Bones*, and *Sinewes*, stamped, and well strained, would be a very *Nourishing Broth*: We find also that *Scotch Skinck*; (which is a *Pottage*, of strong *Nourishment*) is made

made with the *Knees*, and *Sinews* of *Beef*; but long boiled: *Felly* also, which they use for a Restorative, is chiefly made of *Knuckles* of *Veal*. The *Pulp* that is within the *Crawfish* or *Crab*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crab*, or *Crawfish*. The *Yolkes* of *Eggs* are clearly more Nourishing than the *Whites*. So that it should seem, that the Parts of *Living Creatures*, that lie more Inwards, nourish more than the Outward *Flesh*: Except it be the *Brain*, which the Spirits prey too much upon, to leave it any great Vertue of Nourishing. It seemeth for the Nourishing of Aged Men, or Men in Consumptions, some such thing should be Devised; as should be half *Chylus*, before it be put into the Stomach.

Take two large *Capons*; perboyle them upon a soft fire, by the space of an hour, or more, till in effect all the Blood be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shanks*, and throw them away. Then with a good strong Chopping-knife, mince the two *Capons*, bones and all, as small as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, sweet, and well seasoned, of four Gallons of Beer, of 8 strength, new as it cometh from the Tunning; Make in the Kilderkin a great Bung-hole of purpose: Then thrust into it, the Boulter (in which the *Capons* are) drawn out in length; Let it steep in it three Daies, and three Nights, the Bung-hole open, to work; Then close the Bung-hole; and so let it continue, a Day and a half; Then draw it into bottels, and you may drink it well after 3 daies Boteling; And it will last six weeks (approved) It drinketh fresh, slowreth and mantleth exceedingly; It drinketh not newish at all; It is an excellent Drink for a Consumption, to be drunk either alone, or Carded with some other Beer. It quencheth Thirst, and hath no whit of windiness. Note, that it is not possible, that Meat and Bread, either in Broths, or taken with Drink, as is used, should get forth into the veines; and outward Parts, so finely, and easily, as when it is thus Incorporate, and made almost a *Chylus* aforehand.

Triall would be made of the like Brew with *Potato-Roots*; or *Burr-Roots*, or the *Pith* of *Artichokes*, which are nourishing Meats: It may be tried also, with other flesh, As *Pheasant*, *Partridge*, *Young Porke*, *Pig*, *Venison*, especially of young Deer, &c.

A *Mortress* made with the *Brawn* of *Capons*, stamped, and strained, and mingled (after it is made) with like quantity, (at the least) of *Almond Butter*; is an excellent Meat to nourish those that are weak: Better than *Black-Manger*, or *Felly*: And so is the *Cullice* of *Cocks*, boyled thick with the like Mixture of *Almond Butter*: For the *Mortress*, or *Cullice*, of it self, is more Savory and strong; And not so fit for Nourishing of weak Bodies; But the *Almonds* that are not of so high a tast as *Flesh*, do excellently qualifie it.

Indian Maiz hath (of certain) an excellent Spirit of Nourishment; But it must be thoroughly boyled, and made into a *Maiz-Cream* like a *Barley-Cream*. I judge the same of *Rize*, made into a Cream; For *Rize* is in *Turkey*, and other Countries of the East, most fed upon; But it must be thoroughly boyled in respect of the Hardness of it: And also because otherwise it bindeth the body too much.

Pistachoes, so they be good, and not musty, joyned with *Almonds* in *Almond Milk*; Or made into a *Milk* of themselves, like unto *Almond Milk*, but more green, are an excellent Nourisher: But you shall do well, to adde a little *Ginger*, scraped, because they are not without some subtil windiness.

51

Milk warme from the Cow, is found to be a great Nourisher, and a good Remedy in *Consumptions*: But then you must put into it, when you Milk the Cow, two little bags; the one of *Powder of Mint*, the other of *Powder of Red Roses*; For they keep the *Milk* somewhat from Turning, or Crudling in the Stomach; And put in *Sugar* also, for the same cause and partly for the Taste sake; But you must drink a good draught, that it may stay less time in the Stomach, lest it Crudle: And let the Cup into which you milk the Cow, be set in a greater Cup of hot water, that you may take it warme. And *Cow-milk* thus prepared, I judge to be better for a *Consumption*, than *As-milk*, which (it is true) turneth not so easily, but it is a little harrish; Marry it is more proper for Sharpness of Urine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans-milk* likewise is prescribed, when all fail: but I commend it not; as being a little too near the Juice of Mans Body, to be a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

52

Oyl of Sweet Almonds, newly drawn, with *Sugar*, and a little *Spice*, spread upon Bread toasted, is an Excellent Nourisher; But then to keep the *Oyl* from frying in the Stomach, you must drink a good draught of Milde Beer after it; And to keep it from relaxing the Stomach too much, you must put in a little Powder of Cinnamon.

53

The *Yolkes of Eggs* are of themselves so well prepared by Nature for Nourishment; As (to they be Potched, or Reare boyled) they need no other Preparation, or Mixture; yet they may be taken also raw, when they are new laid, with *Malmesey*, or *Sweet Wine*; You shall do well to put in some few Slices of *Eringium Roots*, and a little *Amber-grice*; For by this meanes, besides the immediate Facultie of Nourishment, such Drink will strengthen the Back; so that it will not draw down the *Urine* too fast; For too much *Urine* doth alwayes hinder Nourishment.

54

Mincing of Meat, as in *Pies*, and *Buttered Minced Meat*, saveth the Grinding of the Teeth; And therefore, (no doubt) it is more Nourishing; Especially in Age; Or to them that have weak Teeth; But the Butter is not so proper for weak Bodies; And therefore it were good to moisten it with a little *Claret Wine*, Pill of *Limon*, or *Orange*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmeg*. As for *Chuetts*, which are likewise minced Meat, instead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistachemilk*; or *Barley*, or *Maiz Creame*; Adding a little *Coriander-Seed*, and *Carraway-Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reserve to the due place.

We have hitherto handled the Particulars which yeeld best, and easiest, and plentifullest Nourishment; And now we will speak of the best Meanes of Conveying, and Converting the Nourishment,

55

The First Meanes is, to procure that the *Nourishment* may not be robbed, and drawn away; wherein that, which we have already said, is very Materiall; To provide, that the *Reines* draw not too strongly an over-great Part of the *Blood* into *Urine*. To this adde that Precept of *Aristotle*, that *Wine* be forborne in all *Consumptions*; For that the *Spirits of the Wine*, do prey upon the Rosside Juice of the Body, and inter-common with the *Spirits of the Body*, and so deceive and rob them of their Nourishment. And therefore if the *Consumption* growing from the weakness of the Stomach, do force you to use *Wine*; let it alwayes be burnt; that the *Quicker Spirits* may evaporate; or at the least quenched with two little wedges of *Gold*, 6 or 7 times repeated. Adde also this Provision, that there be not too much Expence

of

of the *Nourishment*, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to be followed, who adviseth quite contrary to that which is in use: Namely, that the *Linnen*, or *Garment* next the *Flesh*, be in *Winter* drie, and oft changed; And in *Summer* seldome changed, and smeared over with *Oyl*; For certain it is, that any *Substance* that is fat, doth a little fill the *Pores* of the *Body*, and stay *Sweat*, in some *Degree*. But the more cleanly way is, to have the *Linnen* smeared lightly over, with *Oyl* of *Sweet Almonds*; And not to forbear shifting as oft as is fit.

The Second *Meanes* is to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must be by *Strengthening* of the *Stomach*; And in this, because the *Stomach* is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt, it is good to resort to *Outward Applications* to the *Stomach*: Wherein it hath been tried, that the *Quills* of *Roses*, *Spices*, *Mastick*, *Wormwood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it, And after it be dried a little before the *Fire*, to put it within a clean *Napkin*, and to lay it to the *Stomach*: For it is certain, that all *Flower* hath a potent *Virtue* of *Absorption*; Inasmuch as it hardeneth a piece of *flesh*, or a *Flower*, that is laid in it: And therefore a *Bag* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lie long.

The Third *Meanes* (which may be a branch of the former) is to send forth the *Nourishment* the better by *Sleep*. For we see, that *Beares*, and other *Creatures* that *sleep* in the *Winter*, wax exceeding fat: And certain it is, (as it is commonly believed) that *Sleep* doth *Nourish* much; Both for that the *Spirits* do less spend the *Nourishment* in *Sleep*, than when living *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the *Nourishment* into the *Parts*. Therefore in *Aged men*, and weak *Bodies*, and such as abound not with *Choler*, a short *Sleep* after dinner doth help to *Nourish*; For in such *Bodies* there is no fear of an over-hasty *Digestion*, which is the *Inconvenience* of *Post-meridian Sleeps*. *Sleep* also in the *Morning* after the taking of somewhat of easie *Digestion*; As *Milk* from the *Cow*, *Nourishing Broth*, or the like, doth further *Nourishment*: But this would be done, sitting upright, that the *Milk* or *Broth* may pass the more speedily to the bottome of the *Stomach*.

The Fourth *Meanes* is to provide that the *Parts* themselves may draw to them the *Nourishment* strongly. There is an excellent *Observation* of *Aristotle*; That a great reason, why *Plants* (some of them) are of greater *Age*, than *Living Creatures*; is, for that they yearly put forth new *Leaves*, and *Boughs*; whereas *Living Creatures* put forth (after their *Period* of *Growth*) nothing that is young, but *Hair* and *Nails*, which are *Excrements*, and no *Parts*. And it is most certain, that whatsoever is young, doth draw *Nourishment* better, than that which is *Old*; And then (that which is the *Mysterie* of that *Observation*) young *Boughes*, and *Leaves*, calling the *Sap* up to them; the same *Nourisheth* the *Body*, in the *Passage*. And this we see notably proved also, in that the oft cutting, or *Polling* of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their *Lasting*. Transfere therefore this *Observation* to the *Helping* of *Nourishment* in *Living Creatures*: The *Noblest* and *Principall* Use whereof is, for the *Prolongation* of *Life*: *Restoration* of some *Degree* of *Youth*; and *Inteneration* of the *Parts*: For certain it is, that there are in *Living Creatures* *Parts* that *Nourish*, and *Repair* easily; And *Parts* that

Nourish and repair hardly ; And you must refresh, and renew those that are easie to Nourish, that the other may be refreshed, and (as it were) Drink in Nourishment, in the Passage. Now we see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beef ; And Men after long Emaciating Diets, wax plump, and fat, and almost new : So that you may surely conclude, that the frequent and wise Use of those *Emaciating Diets*, and of *Purgings* ; And perhaps of some kind of *Bleeding* ; is a principall Meanes of *Prolongation of life*, and *Restoring* some Degree of *Youth* : For as we have often said, *Death* cometh upon *Living Creatures* like the Torment of *Mezentius*,

Mortua quinetiam jungebat Corpora vivis.

Compones Manibusque Manus, atque Oribus Ora.

For the Parts in Mans Body easily reparable, (as *Spirits, Blood, and Flesh*) die in the Embrace of the Parts hardly reparable, (as *Bones, Nerves, and Membranes*) And likewise some *Entrails* (which they reckon amongst the *Spermativall Parts*) are hard to repair : Though that Division of *Spermativall, and Menstruall Parts*, be but a Conceit : And this same *Observation* also may be drawn to the present purpose of Nourishing Emaciated Bodies : And therefore *Gentle Friction* draweth forth the Nourishment, by making the Parts a little hungry, and heating them ; whereby they call forth Nourishment the better. This *Friction* I wish to be done in the Morning. It is also best done by the *Hand*, or a piece of *Scarlet-wooll*, wet a little with *Oyl of Almonds*, mingled with a small Quantity of *Bay salt*, or *Saffron* ; We see that the very Currying of *Horses* doth make them fat, and in good liking.

59

The fifth *Meanes* is, to further the very *Act*, of *Assimilation of Nourishment*, which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I have compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The use of it would be between Sleeps ; For in the latter Sleep the Parts *Assimilate* chiefly.

Experiment
Solitary, touch-
ing *Filum*
Medicinale.

60

THere be many *Medicines*, which by themselves would do no Cure, but perhaps Hurt, but being applied in a certain Order, one after another, do great Cures. I have tried (my self) a *Remedy* for the *Gout*, which hath seldom failed, but driven it away in 24. Houres space : It is first to apply a *Pulvis* ; Of which *vide* the *Receit* ; And then a *Bath* or *Fomentation*, of which *vide* the *Receit* ; And then a *Plaster*, *vide* the *Receit*. The *Pulvis* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours ; But yet in regard of the way made by the *Pulvis*, Draweth gently ; And therefore draweth the Humours out ; and doth not draw more to it ; For it is a *Gentle Fomentation*, and hath with all a Mixture (though very little) of some *Stupescitive*. The *Plaster* is a Moderate *Astringent Plaster*, which repelleth New Humour from falling. The *Pulvis* alone would make the Part more soft, and weak ; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weak, without way made by the *Pulvis*, would draw forth little ; If too strong, it would draw to the Part, as well as draw from it. The *Plaster* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pulvis* is to be laid to, for two or three Houres : The *Fomentation* for a Quarter of an Hour, or somewhat better, being used hot and seven or eight times repeated : The *Plaster* to continue on still, till the Part be well confirmed.

There

THere is a secret Way of Cure, (unpractized) By *Assuetude* of that which in it self hurteth. *Poysons* have been made by some, Familiar, as hath been said. *Ordinary Keepers* of the Sick of the *Plague*, are seldome infected. *Enduring of Tortures*, by *Custom*, hath been made more easie: The *Brooding* of Enormous *Quantity* of Meats, and so of *Wine* or *Strong Drink*, hath been, by *Custom*, made to be without *Surfeit*, or *Drunkenness*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthificks*, some kinds of *Palsies*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Just Cure of it be not full of perill; And if he find it to be such, let him resort to *Palliation*; And alleviate the *Symptome*, without busying himself too much with the perfect *Cure*: And many times, (if the *Patient* be indeed patient) that Course will exceed all Expectation. Likewise the *Patient* himself may strive, by little and little, to Overcome the *Symptome*, in the Exacerbation, and so, by time, turn Suffering into Nature.

Experiment
Solitary, touch-
ing Cure by
Custom.

61

Divers *Diseases*, especially *Chronicall*, (such as *Quartain Agues*) are sometimes cured by *Surfeit*, and *Excess*: As *Excess* of *Meat*, *Excess* of *Drink*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an *Adventitious Strength* from *Custom*, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custom* doth leave them only to their first *Cause*; which if it be any thing weak will fall off. Besides, such *Excesses* do Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment
Solitary, touch-
ing Cure by
Excess.

62

THere is in the Body of Man a great *Consent* in the *Motion* of the severall *Parts*. We see, it is *Childrens sport*, to prove whether they can rub upon their Brest with one hand, and pat upon their Fore-head with another; And straightwaies they shall sometimes rub with both hands, or pat with both hands. We see, that when the *Spirits*, that come to the *Nostrils*, expell a bad Sent, the *Stomach* is ready to Expell by *Vomit*. We find that in *Consumptions* of the *Lungs*, when *Nature* cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they die. So in *Pestilent Diseases*, if they cannot be expelled by *Sweat*, they fall likewise into *Looseness*, and that is commonly *Mortall*. Therefore *Physitians* should ingeniously contrive, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Experiment
Solitary, touch-
ing Cure by
Motion of Con-
sent.

63

Hippocrates *Aphorisme*, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sex*, *Season of the year*, *Diet*, &c. are more dangerous than those that are *Concurrent*. A Man would think it should be otherwise; For that when the *Accident of Sickness*, and the *Naturall Disposition*, do second the one the other; the *Disease* should be more forcible: And so (no doubt) it is; if you suppose like *Quantity* of *Matter*. But that which maketh good the *Aphorisme*, is, Because such *Diseases* do shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the *Contrary*. And therefore in *Diseases* of that kind, let the *Physitian* apply himself more to *Purgation*, than to *Alteration*; Because the offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Experiment
Solitary, touch-
ing Cure of
Diseases which
are contrary to
Disposition.

64

Experiment
Solitary, tou-
ching Preparations
before
Purging, and
settling of the
Body after-
ward.

65

Physicians do wisely prescribe, that there be *Preparatives* used before *Puff Purgations*; For certain it is, that *Purgers* do many times great Hurt, if the Body be not accommodated, both before, and after the *Purging*. The Hurt that they do, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not coming fair away; Which causeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it self, that it purgeth not sufficiently; Therefore the work of *Preparation* is double; to make the *Humours* *fluide*, and mature; And to make the *Passages* more open: For those both help to make the Humours pass readily. And for the former of these, *Syrups* are most profitable; And for the latter, *Apozumes*, or *Preparing Broths*; *Clysters* also help lest the *Medicine* stop in the Guts, and work gripingly. But it is true, that *Bodies* abounding with *Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in themselves; because they make the Humours more fluide. But let a *Physician* beware, how he purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may do after *Purging*; It is caused by the *Lodging* of some *Humours* in *ill Places*: For it is certain, that there be *Humours*, which somewhere placed in the Body, are quiet, and do little hurt; In other Places, (especially *Passages*) do much mischief, Therefore it is good, after *Purging*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purging*, but *Abstersive* and *Mundifying Clysters* also are good to conclude with, to draw away the Reliques of the Humours, that may have descended to the *Lower Region* of the *Body*.

Experiment
Solitary, tou-
ching Stanch-
ing of Blood

66

Blood is stanch'd divers wayes: First by *Astringents*, and *Repercussive Medicines*. Secondly, by *Drawing* of the *Spirits* and *Blood inwards*; which is done by *cold*; As *Iron* or a *Stone* laid to the Neck doth stanch the Bleeding at the Nose; also it hath been tried, that the *Testicles* being put into sharp *Vineger*, hath made a sudden *Recess* of the *Spirits*, and stanch'd *Blood*. Thirdly, by the *Recess* of the *blood* by *Sympathy*. So it hath been tried, that the part that bleedeth, being thrust into the Body of a *Capon*, *Sheep*, new ript and bleeding, hath stanch'd *Blood*; The *Blood*, as it seemeth, sucking and drawing up, by similitude of substance, the *Blood* it meeteth with, and so it self going back. Fourthly, by *Custom* and *Time*; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could find no means, to stanch the *Blood*, either by *Medicine* or *Ligament*; but was fain to have the *Orifice* of the *Wound* stopped by *Mens Thumbs*, succeeding one another, for the space at the least of two *Dayes*; And at the last the *blood* by *Custom* onely retired. There is a fifth *Way* also in use, to let *Blood* in an *Adverse Part*, for a *Revulsion*.

Experiment
Solitary, tou-
ching Change
of Aliments
and Medicines.

67

IT helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine* and *Aliment* still. The Cause is, for that *Nature* by continuall Use of any Thing, groweth to a *Satiety*, and *Dulness*, either of *Appetite*, or *Working*. And we see that *Assuetude* of *Things Hurtfull* doth make them leese their force to Hurt; As *Poyson*, which with use some have brought themselves to brook. And therefore it is no marvell, though *Things helpfull* by *Custom*, leese their force to Help; I count *Intermission* almost the same thing with *Change*; For that, that hath been intermitted, is after a sort new.

IT is found by Experience, that in *Diets of Guaicum, Sarza,* and the like, (especially if they be strict) the *Patient* is more troubled in the beginning, than after continuance; which hath made some of the more delicate Sort of *Patients*, give them over in the midst, Supposing that if those *Diets* trouble them to much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, do drie up *Humours, Rheums,* and the like; And they cannot Drie up untill they have first attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deal more, untill it be dried up, and consumed. And therefore *Patients* must expect a due time, and not check at them at the first.

Experiment
Solitary touch-
ing *Diets.*
68

THE Producing of Cold is a thing very worthy the Inquisition; both for Use and Disclosure of Causes. For *Heat* and *Cold* are *Natures* two hands, whereby she chiefly worketh: And *Heat* we have in readines, in respect of the *Fire*: But for *Cold* we must stay till it cometh; or seek it in deep Caves, or high Mountaines: And when all is done, we cannot obtain it in any great degree: For *Furnaces of Fire* are farre hotter, than a *Summers Sun*, But *Vaults* or *Hills* are not much Colder than a *Winters Frost*.

Experiments
in Confort
touching the
Production of
Cold.

The first Meanes of Producing Cold, is that which *Nature* presenteth us withall; Namely, the Expiring of cold out of the *Inward Parts of the Earth* in *Winter*, when the *Sun* hath no power to overcome it; the *Earth* being (as hath been noted by some (*Primum Frigidum.*) This hath been asserted, as well by *Ancient*, as by *Modern Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the discourse in *Plutarch*, (for I take it, that book was not *Plutarchs* own). *De primo Frigido*. It was the opinion of *Teleseus*, who hath renewed the *Philosophy* of *Parmenides*, and is the best of the *Novelists*.

69

The second Cause of Cold is the Contact of Cold Bodies; For Cold is Active and Transitive into Bodies Adjacent, as well as Heat: which is seen in those things that are touched with *Snow* or *Cold water*. And therefore, who-soever will be an *Enquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice*; Such as they use of delicacy, to cool *Wine* in *Summer*: Which is a Poor and Contemptible use, in respect of other uses, that may be made of such *Conservatories*.

70

The Third Cause is the Primary Nature of all *Tangible Bodies*: For it is well to be noted, that all Things whatsoever (*Tangible*) are of themselves Cold; Except they have an Accessory Heat by *fire, Life,* or *Motion*: For even the *Spirit of Wine,* or *Chymicall Oyles*, which are so hot in Operation, are to the first Touch, Cold; And *Air* it self compressed, and Condensed a little by blowing, is Cold.

71

The Fourth Cause is the Density of the Body; For all Dense Bodies are Colder than most other Bodies; As *Metals, Stone, Glass*; and they are longer in Heating than *Softer Bodies*. And it is certain, that *Earth, Dense, Tangible*, hold all of the Nature of Cold. The Cause is, for that all *Matters Tangible* being Cold, it must needs follow, that where the *Matter* is most Congregate, the Cold is the greater.

72

73

The Fifth Cause of Cold, or rather of encrease and vehemency of Cold, is a *Quick Spirit* inclosed in a Cold Body: As will appear to any that shall attentively consider of Nature in many Instances. We see Nitre (which hath a *Quick Spirit*) is Cold; more Cold to the Tongue, than a Stone; So Water is Colder than Oil, because it hath a *Quicker Spirit*; For all Oil, though it hath the Tangible Parts better digested than Water, yet hath it a duller Spirit: So Snow is Colder than Water, because it hath more Spirit within it: So we see that Salt put to Ice (as in the producing of the Artificiall Ice) encreaseth the Activity of Cold: So some Insecta which have Spirit of Life, as Snakes, and Silkworms, are to the touch, Cold. So Quick-silver is the Coldest of Metals, because it is fullest of Spirit.

74

The Sixth Cause of Cold is the Chasing and Driving away of Spirits, such as have some Degree of Heat: For the Banishing of the Heat must needs leave any Body Cold. This we see in the Operation of Opium, and Stupefactives, upon the Spirits of living Creatures: And it were not amiss to trie Opium, by laying it upon the Top of a Weather-glass, to see whether it will contract the Air: But I doubt it will not succeed: For besides that the vertue of Opium will hardly penetrate thorow such a Body as Glass, I conceive that Opium, and the like, make the Spirits flie rather by Malignity, than by Cold.

75

Seventhly, the same Effect must follow upon the Exhaling or Drawing out of the warm Spirits, that doth upon the flight of the Spirits. There is an Opinion, that the Moon is Magneticall of Heat, as the Sun is of Cold and Moisture: It were not amiss therefore to trie it, with Warm-waters: The one exposed to the Beames of the Moon; the other with some Skreen betwixt the Beames of the Moon and the Water; As we use to the Sun for Shade; And to see whether the former will cool sooner. And it were also good to enquire, what other Meanes there may be, to draw forth the Exile heat which is in the Air; for that may be a Secret of great Power to Produce Cold weath.r.

Experiments
in Confort
touching the
Version, and
Transmutation
of Air into
Water.

WE have formerly set down the Meanes of turning Air into Water, in the Experiment 27. But because it is Magnale Nature; and tender to the subduing of a very great effect; And is also of Manifold use; we will adde some Instances in Confort that give light thereunto.

76

It is reported by some of the Ancients, that Sailers have used, every Night, to hang Fleeces of Wooll on the sides of their Ships, the Wooll towards the Water; And that they have crushed fresh Water out of them, in the Morning, for their use. And thus much we have tried, that a Quantity of Wooll tied loose together, being let down into a deep Well; And hanging in the Middle, somethree Fathome from the Water, for a night, in the Winter time; encreased in weight, (as I now remember) to a fifth Part.

77

It is reported by one of the Ancients, that in Lydia, near Pergamus, there were certain Work-men, in time of wars fled into Caves; And the Mouth of the Caves being stopped by the Enemies, they were famished. But long time after the dead Bones were found; And some Vessels which they had carried with them; And the Vessels full of Water; And that Water, thicker, and more towards Ice, than Common Water: which is a Notable Instance of Condensation, and Induration by Buriall under Earth, (in Caves) for long time; And of version also (as it should seem) of Air into Water;

if any of those vessels were Empty. Trye therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like in *Quick-silver*: And if you find the *Bladders* fallen, or shrunk; you may be sure the *Air* is condensed by the *Cold* of those *Bodies*; As it would be in a *Cave* under *Earth*.

It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *Water* open in a Roome where *Cloves* are kept, it will be drawn drie in 24 houres; Though it stand at some distance from the *Cloves*. In the Country, they use many times, in deceit, when their *Wool* is new shorn, to set some Pailes of *Water* by, in the same Roome; to encrease the weight of the *Wool*. But it may be, that the Heat of the *Wool*, remaining from the body of the Sheep; or the Heat gathered by the lying close of the *Wool*, helpeth to draw the watry Vapour; But that is nothing to the *Version*.

It is reported also credibly, that *Wool* new shorn, being laid casually upon a *Vessell* of *Verjuyce*, after some time, had drunk up a great part of the *Verjuyce*, though the *Vessell* were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (upon the by) to be noted, the *Percolation*, or *Suing* of the *Verjuyce* through the wood; For *Verjuyce* of it self would never have passed thorow the wood: So as, it seemeth, it must be first in a kind of Vapour, before it pass.

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Air* into *Water*, when the *Air* is not in gros, but subtilly mingled with *Tangible Bodies*, is, (as hath been partly touched before) for that *Tangible Bodies* have an Antipathy with *Air*; and if they find any *Liquid Body*, that is more dense, near them, they will draw it: And after they have drawn it, they will condense it more, and in effect incorporate it; For we see that a *Sponge*, or *Wool*, or *Sugar*, or a *Woollen-cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquor* higher, and beyond the place: where the *Water* or *Wine* cometh. We see also, that *Wood*, *Lute-strings*, and the like, do swell in moist Seasons: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth* of *Boxes*, and *Opening* of *Wainscot doores*; which is a kind of *Insufion*: And is much like to an *Insufion* in *Water*, which will make *Wood* to Swell: As we see in the *Filling* of the *Chops* of *Bowles*, by laying them in *Water*. But for that part of these *Experiments*, which concerneth *Attraction*, we will reserve it to the proper *Title* of *Attraction*.

There is also a *Version* of *Air* into *Water*, seen in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist *Air* thickned against the hard body. But it is plain, that it is the latter; For that we see *Wood painted with Oyl Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothness and Closeness; which letteth in no part of the Vapour, and so turneth it back, and thickneth it into Dew. We see also, that *Breathing* upon a *Glass*, or Smooth body giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall find drops of Dew upon the Inside of *Glass-windowes*; And the *Frost* it self upon the ground; is but a *Version*, or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Rain*, are but the Returns of Moist vapours Condensed; The Dew, by the *Cold* only of the Suns departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Air*; which is the more violent *Cold*.

It is very probable (as hath been touched) that that, which will turn

Water

78

79

80

81

82

Water into *Ice*, will likewise turn *Air* some Degree nearer unto *Water*. Therefore trie the *Experiment* of the *Artificiall Turning Water into Ice* (whereof we shall speak in another place) with *Air* in place of *Water*, and the *Ice* about it. And although it be a greater Alteration to turn *Air* into *Water*, than *Water* into *Ice*: Yet there is this Hope, that by Continuing the *Air* longer time, the effect will follow; For that *Artificiall Conversion* of *Water* into *Ice*, is the work of a few Houres; And this of *Air* may be tried by a Months space, or the like.

Experiments
in Confort
touching In-
duration of
Bodies.

Induration, or Lapidification, of Substances more soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Accelerating thereof is very worthy to be enquired. It is effected by three Meanes. The first is by *Cold*; whose Property is to *Condense*, and constipate, as hath been said. The Second is by *Heat*; which is not proper but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And upon that, the more gross of the Tangible Parts do contract and servethemselves together; Both to avoid *Vacuum* (as they call it) And also to Munitethemselves against the Force of the *Fire*, which they have suffered. And the Third is by *Assimilation*, when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Minerals*, which come (no doubt) at first, of Juyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Brick*, and *Tile*: Also the Making of *Glass*, of a certain Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, and *Cbryball*, which harden with time: Also the *Induration* of *Beaa-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, and *Spiders*, which are found in it: And many more. But we will speak of them distinctly.

83

For *Indurations* by *Cold*, there be few Trials of it; For we have no strong or intense *Cold* here on the Surface of the *Earth*, so near the Beames of the Sun, and the Heavens. The likeliest Triall is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* activated by *Nitre*, or *Salt*, will turn *Water* into *Ice*, and that in a few houres; So it may be, it will turn *Wood*, or *Stiff Clay*, into *Stone*, in longer time. Put therefore, into a *Con-serving Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*) a Piece of *Wood*, or a Piece of *Tough Clay*, and let it lie a month, or more.

84

Another Triall is by *Metalline Waters*, which have virtuall *Cold* in them.

Put

Put therefore *Wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And trie whether it will not harden in some reasonable time. But I understand it, of *Metalline Waters*, that come by *Washing*, or *Quenching*; And not of *Strong Waters* that come by dissolution; for they are too *Corrosive* to consolidate.

It is already found, that there are some *Naturall Spring-waters*, that will *Inlapi-date Wood*; So as you shall see one peice of *Wood*, whereof the Part above the *Water* shall continue *Wood*; And the Part under the *Water* shall be turned into a kind of *Gravelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would be more particular *Inquiry* made of them. It is certain, that an *Egg* was found, having lien many yeares in the bottome of a *Moat*, where the *Earth* had somewhat overgrown it: And this *Egg* was come to the *Hardness* of a *Stone*; And had the *Colours* of the *White* and *Yolk* perfect: And the *Shell* shining in small grains like *Sugar*, or *Alabaster*.

Another *Experience* there is of *Induration* by *Cold*, which is already found; which is, that *Metalls* themselves are hardened by often *Heating* and *Quenching* in *Cold water*: For *Cold* ever worketh most potently upon *Heat* precedent.

For *Induration* by *Heat*, it must be considered, that *Heat*, by the *Exhaling* of the *Moister* Parts, doth either harden the *Bodie*; As in *Bricks*, *Tiles*, &c. Or if the *Heat* be more fierce, maketh the grosser Part it self, *Run* and *Melt*; As in the making of ordinary *Glass*; And in the *Vitrification* of *Earth*, (as we see in the *Inner* Parts of *Fornaces*) And in the *Vitrification* of *Brick*; And of *Metals*. And in the former of these, which is the *Hardening* by *baking*, without *Melting*, the *Heat* hath these degrees; First, it *Indurates*; and then maketh *Fragile*; And lastly, it doth *Incinerate*, and *Calcinate*.

But if you desire to make an *Induration* with *Toughness*, and less *Fragility*; A middle way would be taken; Which is that which *Aristotle* hath well noted, but would be thoroughly verified. It is, to decoct *Bodies* in *Water*, for two or three daies; But they must be such *Bodies*, into which the *Water* will not enter; As *Stone*, and *Metal*. For if they be *Bodies* into which the *Water* will enter, then long *Seething*, will rather *Soften* than *Indurate* them; As hath been tried in *Eggs*, &c. Therefore, *Softer Bodies* must be put into *Bottles*; And the *Bottles* hung into *Water* seething, with the *mouths* open, above the *Water*: that no *Water* may get in; For by this *Meanes*, the *virtuall Heat* of the *Water* will enter; And such a *Heat*, as will not make the *Body* adust, or *fragile*; But the *Substance* of the *Water* will be shut out. This *Experiment* we made; and it sorted thus; It was tried with a piece of *Free-stone*, and with *Pewter*, put into the *Water* at large; The *Free-stone* we found received in some *Water*; For it was softer and easier to scrape, than a piece of the same *Stone* kept drie. But the *Pewter* into which no *Water* could enter, became more white, and liker to *Silver*, and less flexible, by much. There were also put into an *Earthen Bottle*, placed as before, a good *Pellet* of *Clay*, a *Piece* of *Cheese*, a *Piece* of *Chalk*, and a *Piece* of *Free-stone*. The *Clay* came forth almost of the *Hardness* of *Stone*; The *Cheese* likewise very hard, and not well to be cut: The *Chalk* and the *Free-stone* much harder than they were. The *Colour* of the *Clay* inclined not a whit to the *Colour* of *Brick*, but rather to white, as in ordinary *Drying* by the *Sun*. Note, that all the former *Trials* were made by a *Boyling* upon a good hot *Fire*, renewing the *Water* as it consumed, with other hot *Water*; But the *Boyling*

was

was but for twelve houres only; And it is like that the Experiment would have been more effectual, if the Boyling had been for two or three dayes, as we prescribed before.

89

78

As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) we see Examples of it in some *stones*, in *Clay-Grounds*, lying near to the top of the Earth, where *Pebble* is; In which you may manifestly see divers *Pebbles* gathered together, and a Crust of *Cement* or *Stone*, between them, as hard as the *Pebbles* themselves: And it were good to make a Triall of purpose, by taking *Clay*, and putting in it divers *Pebble Stones*, thick set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lump, in which no *Pebbles* are set. We see also in Ruines of old Walls, especially towards the Bottom, the *Mortar* will become as hard as the *Brick*; We see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar* harder than the *Wood* it self; And *Scales* likewise grow to the *Teeth*, harder than the *Teeth* themselves.

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78

Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no Nourishment that the *Tree* receiveth, or that the *living Creature* receiveth, is so hard as *Wood*, *Bone*, or *Horn*, &c. but is *Indurated* after by *Assimilation*.

Experiment
Solitary, touch-
ing the Ver-
sion of Water
into Air.

91

THE Eie of the Understanding, is like the Eie of the Sense: For as you may see great Objects through small *Cranies*, or *Levels*: So you may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Air* upon *watry Moisture*, and *Version* of the same into *Air*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasses*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detain, or Imbibe the *Moisture*; For the *Mistiness* scattereth and breaketh up suddenly. But the like *Cloud*, if it were *Oily*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Air* preyeth upon *Water*; And *Flame*, and *Fire*, upon *Oil*; And therefore, to take out a Spot of *Grease*, they use a *Coal* upon brown Paper; Because *Fire* worketh upon *Grease*, or *Oil*, as *Air* doth upon *Water*. And we see *Paper oiled*, or *Wood oiled*, or the like, last long moist, but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Air* medleth little with the *Moisture* of *Oil*.

Experiment
Solitary, touch-
ing the Force
of Union.

92

THERE is an Admirable demonstration, in the same trifling Instance of the little *Cloud* upon *Glasses*, or *Gemmes*, or *Blades of Swords*, of the Force of *Union*, even in the least Quantities, and weakest Bodies; how much it conduceth to Preservation of the present Forme; And the Resisting of a New. For mark well the discharge of that *Cloud*; And you shall see it ever break up, first in the *Skirts*; and last in the *Midst*. We see likewise, that much *Water*, draweth forth the *Juice* of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation upon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiveth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that should subdue it.

Experiment
Solitary, touch-
ing the Pro-
ducing of Fea-
thers and Hairs
of divers Col-
ours.

93

WE have spoken before, in the fifth Instance, of the Cause of *Orient Colours*, in *Birds*; Which is by the Fineness of the Strainer; we will now endeavour to reduce the same *Axiome* to a *Work*. For this Writing

ting of our *Sylva Sylvarum*, is (to speak properly) not *Naturall History*, but a high kind of *Naturall Magick*. For it is not a Description only of Nature, but a Breaking of Nature, into great and strange Workes. Try therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their Down; Or of *Whelps*, cutting their Hair as short as may be: Or of some other Beast; with some oyntment, that is not hurtfull to the flesh; And that will harden, and stick very close; And see whether it will not alter the Colours of the *Feathers*, or *Hair*. It is received, that the *Pulling* off, the first *Feathers* of *Birds*, clean, will make the new come forth *White*: And it is certain, that *White* is a penurious Colour, and where moisture is scant. So *Blew Violets*, and other *Flowers*, if they be starved, turn *Pale* and *White*; *Birds*, and *Horses*, by Age, or Scarres, turn *White*: and the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that come first, will be many times of divers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the *Feathers* will come *White*. This is a good *Experiment*, not only for the Producing of *Birds* and *Beasts* of strange Colours; but also, for the Disclosure of the Nature of *Colours* themselves; which of them require a finer Porosity, and which a grosser.

IT is a work of Providence, that hath been truly observed by some; That the *Tolk* of the *Egg*, conduceth little to the *Generation* of the *Bird*; but only to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched, you shall find much of the *Tolk* remaining. And it is needfull, that *Birds*, that are shaped without the Females Womb, have in the *Egg*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egg* is laid, and severed from the Body of the *Hen*, It hath no more Nourishment from the *Hen*; but only a quickning *Heat* when she sitteth. But *Beasts*, and Men need not the matter of Nourishment within themselves; because they are shaped within the Womb of the Female, and are Nourished continually from her Body.

Experiments Solitary touching the Nourishment of Living Creatures before they be brought forth.

94

IT is an inveterate and received Opinion, that *Camtharides* applied to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Received, that a kind of *Stone*, which they bring out of the *West-Indies*, hath a peculiar force to move *Gravell*, and to dissolve the *Stone*; inasmuch as laid but to the *Wrest*, it hath so forcibly sent down *Gravell*, as Men have been glad to remove it; It was so violent.

Experiments in Consort touching Sympathy and Antipathy for Medicinall use.

95

It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As we see, *Going wet-shod*, to those that use it not, affecteth both: Applications of *hot Pouders* to the *feet* attenuate first, and after dry the *Rheume*: And therefore a *Physitian*, that would be Mystically, prescribeth, for the Cure of the *Rheume*, that a Man should walk Continually upon a *Camomill-alley*; Meaning, that he should put *Camomill* within his Socks. Likewise *Pigeons bleeding*, applied to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applied unto them, provoke *sleep*.

96

It seemeth, that as the *Feet* have a Sympathy with the *Head*; So the *Wrests* and *Hands*, have a Sympathy with the *Heart*: We see the affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tryed, that Juices of *Stock-gilly-flowers*, *Rose-campion*, *Garlick*, and other things; applied to the *Wrests*, and renewed; have cured long *Agues*.

97

And I conceive, that washing with certain *Liquours*, the *Palmes* of the *Hands*, doth much good: And they do well in *Heats* of *Agues*, to hold in the *Hands*, *Eggs* of *Alabaster*, and *Balls* of *Crystall*.

Of these things we shall speak more, when we handle the Title of Sympathy and Antipathy, in the proper place.

Experiment
Solitary tou-
ching the Se-
cret Processes
of Nature.

89

THE Knowledge of man (hitherto) hath been determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Fineness* of the *Body* it self; or the *Smallness* of the *Parts*; or of the *Subtily* of the *Motion*; is little inquired. And yet these be the Things that Govern Nature principally; And without which, you cannot make any true *Analysis* and *Indication* of the *Proceedings* of Nature. The *Spirits* or *Pneumatics*, that are in all *Tangible Bodies*, are scarce known. Sometimes they take them for *Vacuum*; whereas they are the most Active of *Bodies*. Sometimes they take them for *Air*; From which they differ exceedingly, as much as *Wine* from *Water*; And as *Wood* from *Earth*. Sometimes they will have them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will have them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are things by themselves. And then, when they come to *Plants* and *living Creatures*, they call them *Souls*. And such *Superficial Speculations* they have; Like *Prospectives*, that shew things inward, when they are but *Paintings*. Neither is this a *Question* of *Words*, but infinitely *materiall* in *Nature*. For *Spirits* are nothing else but a *Natural Body*, rarified to a *Proportion*, and included in the *Tangible Parts* of *Bodies*, as in an *Integument*. And they be no less differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or less: And they are never (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and most of the *Effects* of *Nature*. For, as we have figured them in our *Sapientia Veterum*, in the *Fable* of *Proserpina*, you shall in the *Infernall Regiment* hear little doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are *Stupid* things; And the *Spirits* do, in effect, all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath given some light, in discerning by their *Separations*, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *gross* *Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge that *Herbs* and *Drugs* have divers *Parts*; As that *Opium* hath a *Stupefacting* *Part*, and a *Heating* *Part*; The one moving *Sleep*, the other a *Sweat* following; And that *Rubarb* hath *Purging* *Parts*, and *Astringent* *Parts*, &c. But this whole *Inquisition* is weakly and *Negligently* handled. And for the more subtil differences of the *Minute Parts*, and the *Posture* of them in the *Body*, (which also hath great *Effects*) they are not at all touched: As for the *Motions* of the *Minute Parts* of *Bodies*, which do so great *Effects*, they have not been observed at all; because they are *Invisible*, and incur not to the *Eie*; but yet they are to be deprehended by *Experience*: As *Democritus* said well, when they charged him to hold, that the *World* was made of such little *Moats*, as were seen in the *Sunne*; *Atomus* (saith he) *necessitate Rationis & Experimentia esse convincitur; Atomum enim nemo unquam vidit.* And therefore the *Tumult* in the *Parts* of *Solid Bodies*, when they are compressed, which is the *Cause* of all *Flight* of *Bodies* thorow the *Air*, and of other *Mechanicall Motions*, (as hath been partly touched before, and shall be throughly handled in due place,) is not seen

at all. But nevertheless, if you know it not, or enquire it not attentively and diligently, you shall never be able to discern, and much less to produce, a Number of *Mechanicall Motions*. Again, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the Effects (which were mentioned before) pass between the *Spirits*, and the *Tangible Parts*, (which are *Rarefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Passions*, and such other *Logicall Words*.

IT is certain, that of all *Powers in Nature*, *Heat* is the chief; both in the Frame of *Nature*, and in the works of *Art*. Certain it is likewise, that the Effects of *Heat*, are most advanced, when it worketh upon a *Body*, without loss or dissipation of the *Matter*; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is best perceived in *Distillations*, which are performed in close Vessels, and Receptacles. But yet there is a higher Degree; For howsoever *Distillations* do keep the *Body* in Cells, and Cloysters, without Going abroad, yet they give space unto *Bodies* to turn into Vapour; To return into Liqueur; And to Separate one part from another. So as *Nature* doth Expatriate, although it hath not full Liberty: Whereby the true and Ultime Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no such Reciprocation of *Rarefaction*: and of *Condensation*, and of *Separation*, admitted; then it is like that this *Proteus of Matter*, being held by the Sleeves, will turn and change into many *Metamorphoses*. Take therefore a *Square Vessell of Iron*, in form of a Cube, and let it have good thick and strong Sides. Put it into a Cube of *Wood*, that may fill it as close as may be; And let it have a Cover of Iron as strong (at least) as the Sides; And let it be well Luted, after the manner of the *Chymists*. Then place the *Vessell* within burning *Coals* kept quick kindled, for some few houres space. Then take the *Vessell* from the *Fire*, and take off the Cover, and see what is become of the *Wood*. I conceive that since all *Inflammation*, and *Evaporation* are utterly prohibited, and the *Body* still turned upon it Self, that one of these two Effects will follow; Either that the *Body of the Wood* will be turned into a kind of *Amalgama*, (as the *Chymists* call it;) Or that the Finer Part will be turned into *Air*, and the Groffer stick as it were baked, and incrustate upon the Sides of the *Vessell*; being become of a Denfer Matter, than the *Wood* it self, Crude. And for another Triall, take also *Water*, and put it in the like *Vessell*, stopped as before; But use a gentler *Heat* and remove the *Vessell* sometimes from the *Fire*; And again, after some small time, when it is Cold renew the *Heating of it*: And repeat this *Alteration* some few times: And if you can once bring to pass, that the *Water*, which is one of the Simplest of *Bodies*, be changed in Colour, Odour, or Taste, after the manner of Compound *Bodies*, you may be sure that there is a great Work wrought in *Nature*, and a Notable Entrance made into strange Changes of *Bodies*, and productions: And also a Way made to do that by *Fire*, in small time, which the *Sunne* and *Age* do in long time. But of the Admirable Effects of this *Distillation* in *Close*, (for so we call it) which is like the *Wombs* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; We will speak fully, in the due place; Not that we Aim at the making of *Paracelsus Pigmeys*; Or any such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall under the Conceit of *Man*; If the force of it be altogether kept in.

Experiment
Solitary touching the
Power of Heat.

99

Experiments
Solitary tou-
ching the Im-
possibility of
Annihilation.

100

Here is nothing more Certain in Nature, than that it is impossible for any *Body*, to be utterly *Annihilated*; But that, as it was the work of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turn *Somewhat* into *Nothing*. And therefore it is well said by an Obscure Writer of the *Sect* of the *Chymists*; that there is no such way, to effect the Strange *Transmutations* of *Bodies*, as to endeavour and urge by all means, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of *Bodies* from Change; For if you can prohibit, that they neither turn into *Air*, because no *Air* cometh to them; Nor go into the *Bodies Adjacent*, because they are utterly Heterogeneous; Nor make a *Round* and *Circulation* within themselves; they will never change, though they be in their Nature never so Perishable, or Mutable. We see how *Flies* and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument* and *Embalming* of the *Body* of my *King*. And I conceive the like will be of *Bodies* put into *Quick-silver*. But then they must be but thin; As a leaf, or a peece of Paper, or Parchment; For if they have a greater Crassitude, they will alter in their own *Body*, though they spend not. But of this, We shall speak more, when we handle the *Title* of *Conservation of Bodies*.

NATURALL



NATURALL HISTORY.

II. Century.

Musick in the *Practice*, hath been well pursued : And in good *Variety* : But in the *Theory*, and especially in the *Yeeling* of the *Causes* of the *Practick*, very weakly : being reduced into certain *Mysticall Subtilties*, and not much *Truth*. We shall therefore, after our manner, joyn the *Contemplative* and *Active Part* together.

Experiments
in Confort
touching
Musick.

All *Sounds* are either *Musical Sounds*, which we call *Tones* ; Whereunto there may be an *Harmony* ; which *Sounds* are ever *Equall* ; As *Singing*, the *Sounds of Stringed*, and *Wind-Instruments*, the *Ringing of Bels*, &c. Or *Immusical Sounds* ; which are ever *Unequall* ; Such as are the *Voice in Speaking*, all *Whisperings*, all *Voices of Beasts*, and *Birds*, (except they be *Singing Birds*,) all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins*, (as in *Drums*) and infinite others.

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The *Sounds* that produce *Tones*, are ever from such *Bodies*, as are in their *Parts* and *Pores Equall* ; As well as the *Sounds* themselves are *Equall* ; And such are the *Percussions of Metall*, as in *Bels* ; Of *Glass*, as in the *Filling of a Drinking Glass* ; Of *Air*, as in *Mens voices whilst they Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*, as in the *Nightingals Pipes of Regalls*, or *Organs*, and other *Hydraulicks* ; which the *Ancients* had, and *Nero* did so much esteem, but are now lost. And if any *Man* think, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*, And yet produce *Tones* ; he is in an error. For the *Sound* is not created between the *Bow* or *Plectrum*, and the *String* ; But between the *String* and the *Air* ; No more than it is between the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that

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create *Tones*; *Percussion* of *Metalls*, (comprehending *Glass*, and the like) *Percussions* of *Air*; and *Percussions* of *Water*.

103

The *Diapason* or *Eight* in *Musick* is the sweetest *Concord*; Inomuch, as it is in effect an *Unison*; As we see in *Lutes*, that are strung in the *Base Strings* with two strings, one an *Eighth* above another; which make but as one *Sound*. And every *Eighth Note* in *Ascent*, (as from *Eight* to *Fifteen*, from *Fifteen* to *Twenty two*, and so in *infinitum*) are but *Scales of Diapason*. The *Cause* is dark, and hath not been rendred by any; And therefore would be better contemplated. It seemeth that *Air*, (which is the *Subject* of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been said) admitteth much *Variety*; As we see in the *Voices of Living Creatures*; And likewise in the *Voices* of severall *Men*; (for we are capable to discern severall *Men* by their *Voices*) And in the *Conjugation of Letters*, whence *Articulate Sounds* proceed; which of all others are most various. But in the *Sounds* which we call *Tones*, (that are ever *Equall*) the *Air* is not able to cast it self into any such variety; But is forced to recurre into one and the same *Posture* or *Figure*, only differing in *Greatness* and *smallness*. So we see *Figures* may be made of *lines*, *Crooked* and *Straight*, in infinite *Variety*, where there is *Inequality*; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of *Equall lines*) can differ but in *Greater*, or *Lesser*.

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It is to be noted (the rather lest any *Man* should think, that there is any thing in this *Number of Eight*, to create the *Diapason*) that this *Computation of Eight*, is a thing rather received, than any true *Computation*. For a true *Computation* ought ever to be, by *Distribution* into *equall Portions*. Now there be *intervent* in the *Rise of Eight* (in *Tones*) two *Beemolls*, or *Half-notes*; So as if you divide the *Tones* equally, the *Eighth* is but *Seven* whole and *equall Notes*; And if you subdivide that into *Half-notes*, (as it is in the *Stops of a Lute*) it maketh the *Number of Thirteen*.

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Yet this is true; That in the ordinary *Rises* and *Falls* of the *Voice of Man* (not measuring the *Tone* by whole *Notes*, and half *Notes*, which is the *Equall Measure*) there fall out to be two *Beemolls* (as hath been said) between the *Unison* and the *Diapason*: And this *Varying* is naturall. For if a *Man* would endeavour to raise or fall his *Voice*, still by *Half notes*, like the *Stops of a Lute*; or by whole *Notes* alone, without *Halves*, as farre as an *Eighth*; he will not be able to frame his *Voice* unto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all *Harmonicall use*, one *half Note* to be interposed.

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It is to be considered, that whatsoever *Vertue* is in *Numbers*, for *Conducing* to *Concent* of *Notes*, is rather to be ascribed to the *Ante-number*, than to the *Entire Number*; As namely, that the *Sound* returneth after *Six*, or after *Twelve*; So that the *Seventh* or the *Thirteenth* is not the *Matter*, but the *Sixth*, or the *Twelfth*; And the *Seventh* and the *Thirteenth* are but the *limits* and *Boundaries* of the *return*.

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The *Concords* in *Musick* which are *Perfect*, or *Semiperfect*, between the *Unison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*; the *Third* next; And the *Sixth* which is more harsh: And as the *Ancients* esteemed, and so do my self and some Other yet, the *Fourth* which they call *Diatefseron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so in *Infinitum*, they be but *Recurrences* of the *Former*; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eighth* respectively from them.

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For *Discords*, the *Second*, and the *Seventh*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the *One* is next above the *Unison*, the
Other

Other next under the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturb the *Harmony*, though there be a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are *Odious*; And therefore the ordinary *Concert* of *Four Parts* consisteth of an *Eighth*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more *Air*, doth overcome and drown the *Treble*, (unless the *Discord* be very *Odious*) And so hideth a small Imperfection. For we see, that in one of the lower *Strings* of a *Lute*, there soundeth not the *Sound* of the *Treble*, nor any *Mixed Sound*, but only the *Sound* of the *Base*.

We have no *Musick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*. For we see the *Half-Notes* themselves do but interpose sometimes. Never theless we have some *Slides* or *Relishes*, of the *Voice*, or *Strings*, as it were continued without *Notes*, from one *Tone* to another, rising, or falling, which are delightful.

The *Causes* of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There be two Things *Pleasing* to the *Sight* (leaving *Pictures*, and *Shapes* aside, which are but *Secondary Objects*; And please or displease but in *Memory*;) these two are, *Colours*, and *Order*. The *pleasing* of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Ear*; But the *pleasing* of *Order* doth symbolize with *Harmony*. And therefore we see in *Garden-knots*, and the *Frets* of *Houses*, and all equal and well answering *Figures*, (as *Globes*, *Pyramids*, *Cones*, *Cylinders*, &c.) how they please; whereas *unequal Figures* are but *Deformities*. And both these *Pleasures*, that of the *Eie*, and that of the *Ear*, are but the *Effects* of *Equality*, *Good Proportion*, or *Correspondence*: So that (out of *Question*) *Equality*, and *Correspondence*, are the *Causes* of *Harmony*. But to find the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding we shall speak somewhat, (when we handle *Tones*) in the general Enquiry of *Sounds*.

Tones are not so apt altogether to procure *Sleep*, as some other *Sounds*; As the *Wind*, the *Furling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, because they are *Equal*, and slide not, do more strike and erect the *Sense*, than the other. And *Overmuch Attention* hindreth *Sleep*,

There be in *Musick* certain *Figures*, or *Tropes*; almost agreeing with the *Figures* of *Rhetorick*; And with the *Affections* of the *Mind*, and other *Senses*. First, the *Division* and *Quavering*, which please so much in *Musick*, have an Agreement with the *Glittering* of *Light*; As the *Moon-Beames* playing upon a *Wave*. Again, the *Falling* from a *Discord* to a *Concord*, which maketh great *Sweetness* in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Tast*, which is soon glutted with that which is sweet alone. The *Sliding* from the *Close* or *Cadence*, hath an Agreement with the *Figure* in *Rhetorick*, which they call *Prater Expectatum*; For there is a *Pleasure* even in being deceived. The *Reports*, and *Fuges*, have an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Traduction*. The *Triplés*, and *Changing of Times*, have an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley* of one *Dance*.

It hath been anciently held, and observed, that the *Sense of Hearing*, and the *Kinds of Musick*, have most Operation upon *Manners*; As to *Incourage Men*,

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Men, and make them warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and inclin'd to Pity, &c. The Cause is, for that the *Sense of Hearing* striketh the *Spirits* more immediately, than the other *Senses*; And more incorporeally than the *Smelling*; For the *Sight*, *Tast*, and *Feeling*, have their Organs, not of so present and immediate Access to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediately upon the *Spirits*, and is forcible while the Object remaineth) it is with a communication of the Breath, or Vapour of the Object *Odorate*: But *Harmony* entering easily, and Mingling not at all, and Coming with a manifest Motion; doth by Custome of often Affecting the *Spirits*, and Putting them into one kind of Posture, alter not a little the Nature of the *Spirits*, even when the Object is removed. And therefore we see that *Tunes* and *Aires*, even in their own nature, have in themselves some Affinity with the *Affections*; As there be *Merry Tunes*, *Dolefull Tunes*, *Solemn Tunes*; *Tunes inclining Mens minds to Pity*: *Warlike Tunes*, &c. So as it is no Marvell, if they alter the *Spirits*; considering that *Tunes* have a Predisposition to the Motion of the *Spirits* in themselves. But yet it hath been noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of Passions, conforme unto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. We see also that severall *Aires*, and *Tunes*, do please severall *Nations*, and *Persons*, according to the Sympathy they have with their *Spirits*.

Experiments
in Confort
touching
Sounds; and
first touching
the Nullity,
and Entity
of Sounds.

Perspective hath been with some diligence inquired; And so hath the Nature of Sounds; in some sort, as far as concerneth *Musick*. But the Nature of Sounds in generall, hath been superficially observed. It is one of the subtillest Peices of Nature. And besides, I practise, as I do advise: which is, after long Inquiry of Things, immerse in Matter, to interpose some Subject, which is Immatriciate, or less Materiate: Such as this of Sounds: To the end, that the *intellect* may be Rectified, and become not Partiall.

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It is first to be considered, what *Great Motions* there are in Nature, which pass without *Sound*, or *Noise*. The *Heavens* turn about, in a most rapide Motion, without *Noise* to us perceived; Though in some *Dreames* they have been said to make an excellent *Musick*. So the *Motions* of the *Comets*, and *Fiery Meteors*, (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it be thought, that it is the Greatness of distance from us, whereby the *Sound* cannot be heard; We see that *Lightnings*, and *Coruscations*, which are near at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Division of the *Air*. The *Winds* in the *Upper Region* (which move the *Clouds* above (which we call the *Rack*) and are not perceived below) pass without *Noise*. The *lower Winds* in a Plain, except they be strong, make no *Noise*; But amongst *Trees*, the *Noise*, of such *Winds* will be perceived. And the *Winds* (generally) when they make a *Noise*, do ever make it unequally, Rising, and Falling, and sometimes (when they are vehement) Trembling at the Height of their Blast. *Rain*, or *Hail* falling, (though vehemently) yeeldeth no *Noise*, in passing through the *Air*, till it fall upon the *Ground*, *Water*, *Houses*, or the like. *Water* in a *River* (though a swift Stream) is not heard in the *Channell*; but

but runneth in Silence, if it be of any depth; But the very *Stream* upon *Shal-loves*, or *Gravell*, or *Pebble*, will be heard. And *Waters*, when they beat upon the *Shore*, or are strained, (as in the falls of *Bridges*;) Or are dashed against themselves, by *Winds*, give a *Roaring Noise*. Any *peece of Timber*, or, *Hard body*, being thrust forwards by another *Body* *Contiguous*, without knocking, giveth no *Noise*. And so *Bodies* in weighing, one upon another, though the *upper Body* prefs the *lower Body* down, make no *Noise*. So the *Motion* in the *Minute parts* of any *Solid Body*, (which is the *Principal Cause* of *Violent Motion*, though unobserved;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced only by the *Breaking* of the *Air*; And not by the *Impulsion* of the *Parts*. So it is manifest; That where the *Anteriour Body* giveth way, as fast as the *Posteriour* cometh on, it maketh no *Noise*, be the *Motion* never so great, or swift.

Airopen, and at *large*, maketh no *Noise*, except it be sharply percussed; As in the *Sound* of a *String*, where *Air* is percussed by a hard and stiff *Body*; And with a sharp loofe: For if the *String* be not strained, it maketh no *Noise*. But where the *Air* is *pent*, and strained, there *Breath*, or other *Blowing*, (which carry but a gentle *Percussion*), suffice to create *Sound*: As in *Pipes*, and *wind-instruments*. But then you must note, that in *Recorders*, which go with a gentle *Breath*, the *Concave* of the *Pipe*, were it not for the *Fipple*, that straitneth the *Air*, (much more then the *Simple Concave*;) would yeeld no *Sound*. For, as for other *Wind-Instruments*, they require a forcible *Breath*; As *Trumpets*, *Cornets*, *Hunters Horns*, &c. Which appeareth by the blown-Cheeks of him that windeth them. *Organs* also are blown with a strong wind, by the *Bellows*. And note again, that some kind of *Wind-Instruments*, are blown at a small *Hole* in the side, which straitneth the *Breath* at the first entrance; The rather, in respect of their *Traverse*, and *Stop* above the *Hole*, which performeth the *Fipples Part*; As it is seen in *Flutes*, and *Fifes*, which will not give *Sound*, by a blast at the end, as *Recorders*, &c. do. Likewise in all *whistling*, you contract the *Mouth*; And to make it more sharp, Men sometimes use their *Finger*.

But in *Open Air*, if you throw a *Stone*, or a *Dart*, they give no *Sound*: No more do *Bullets*, except they happen to be a little hollowed in the *Casting*; Which *Hollowness* penneth the *Air*: Nor yet *Arrowes*, except they be ruffled in their *Feathers*, which likewise penneth the *Air*. As for *Small Whistles*, or *Shepheards Oaten Pipes*, they give a *Sound*, because of their extreme *Slenderness*, whereby the *Air* is more *pent*, than in a wider *Pipe*. Again the *Voices* of *Men*, and *Living Creatures*, pass through the *throat*, which penneth the *Breath*. As for the *Jewes Harp*, it is a sharp *Percussion*; And besides, hath the vantage of penning the *Air* in the *Mouth*.

Solid Bodies, if they be very softly *Percussed*, give no *Sound*; As when a *Man* treadeth very softly upon *Boards*. So *Chests* or *Doors* in fair weather; when they open easily, give no *Sound*. And *Cart-Wheelles* squeak not when they are liquoured.

The *Flame* of *Tapers*, or *Candles*, though it be a swift *Motion*, and breaketh the *Air*, yet passeth without *Sound*. *Air* in *Ovens*, though (no doubt) it doth (as it were) boyl, and dilate it self, and is repercussed, yet it is without *Noise*.

Flame percussed by Air, giveth a *Noise*; As in blowing of the *Fire* by *Bellows*; Greater, than if the *Bellows* should blow upon the *Air* it self. And so likewise *Flame Percussing the Air strongly* (as when *Flame* suddenly taketh and openeth,) giveth a *Noise*; So great *Flames*, whiles the one impelleth the other, give a bellowing *Sound*.

There

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There is a Conceit runneth abroad, that there should be a *White Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may cause secret Murthers. But it seemeth to me impossible; For, if the *Air pent*, be driven forth, and strike the *Air open*, it will certainly make a *Noise*. As for the *white Powder*, (if any such thing be, that may extinguish, or dead the *Noise*,) it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coal*. For *Petre* alone will not take Fire. And if any Man think, that the *Sound* may be extinguished, or deaded, by discharging the *Pent Air*, before it cometh to the *Mouth* of the *Peece*, and to the *Open Air*; That is not probable; For it will make more divided *Sounds*: As if you should make a Crofs Barrell hollow, thorow the Barrell of a Peece, it may be, it would give severall *Sounds*, both at the Nose, and at the Sides. But I conceive, that if it were possible, to bring to pass, that there should be no *Air pent* at the Mouth of the *Peece* the *Bullet* might flie with small, or no *Noise*. For first it is certain, there is no *Noise* in the Percussion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Air*, maketh no *Noise*; As hath been said. And then, if there be no *Pent Air*, that striketh upon *Open Air*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath been oft said) is in the Parts of the *Bullet*, and not in the *Air*. So as triall must be made by taking some small *Concave* of *Minall*, no more than you mean to fill with Powder; And laying the *Bullet* in the Mouth of it, half out into the *Open Air*.

121

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vain; That there was a *Conspiracy* (which himself hindred,) to have killed *Queen Mary*, Sister to *Queen Elizabeth*, by a *Burning-Glass* when she walked in *Saint James Park*, from the Leads of the House. But thus much (no doubt) is true; That if *Burning-Glasses* could be brought to a great strength, (as they talk generally of *Burning-Glasses*, that are able to burn a *Navy*,) the Percussion of the *Air* alone, by such a *Burning-Glass*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings* without *Thunders*.

122

I suppose that *Impression* of the *Air* with *Sounds*, asketh a time to be conveyed to the *Sense*; As well as the *Impression* of *Species visible*. Or else they will not be heard. And therefore, as the *Bullet moveth* so *swift*, that it is *Invisible*; So the same *Swiftness* of *Motion* maketh it *Inaudible*: For we see, that the *Apprehension* of the *Eye*, is quicker then that of the *Ear*.

123

All *Eruptions* of *Air*, though small and slight, give an *Entity* of *Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-salt*, and *Bay-leaves* cast into the Fire; So in *Chestnuts*, when they leap forth of the *Ashes*; So in *Green Wood* laid upon the Fire, especially, *Roots*; So in *Candles* that spit Flame, if they be wet; So in *Raffing*, *Sneezing*, &c. So in a *Rose leaf* gathered together into the fashion of a Purle, and broken upon the Forehead, or Back of the Hand, as Children use.

Experiments
in Consort,
touching Pro-
duction, Conser-
vation, and De-
laid of Sounds;
And the office
of the Air
therein.

THE Cause given of *Sound*, that it should be an *Elision* of the *Air* (where-
by, if they mean any thing, they mean *Cutting* or *Dividing*, or else
an *Attenuating* of the *Air*) is but a Terme of Ignorance: And the Motion
is but a Catch of the Wit upon a few Instances; As the Manner is in the
Philosophy Received. And it is common with Men, that if they have gotten a
Pretty *Expression* by a *Word of Art*, that *Expression* goeth currant, though
it be empty of *Matter*. This Conceit of *Elision*, appeareth most manifestly

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to

to be false, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, sometime, after the *Percussion*; but ceaseth straight-waies, if the *Bell*, or *String*, be touched and stayed: whereas, if it were the *Elifion* of the *Air*, that made the *Sound*, it could not bee, that the Touch of the *Bell*, or *String*, should extinguish so suddenly that Motion, caused by the *Elifion* of the *Air*. This appeareth yet more manifestly, by *Chiming* with a Hammer upon the Out-side of a *Bell*; For the *Sound* will be according to the inward Concave of the *Bell*; whereas the *Elifion*, or *Attenuation* of the *Air* cannot be but only between the Hammer and the Out-side of the *Bell*. So again if it were an *Elifion*, a broad *Hammer*, and a *Bodkin*, struck upon Metall; would give a diverse *Tone*; as well as a diverse Loudness: But they do not so; For though the *Sound* of the one be *Louder*, and of the other *Softer*; yet the *Tone* is the same. Besides, in *Eccho's* (whereof some are as loud as the *Originall Voice*;) there is no new *Elifion*, but a *Repercussion* only. But that which convinceth it most of all, is; that *Sounds* are generated, where there is no *Air* at all. But these and the like Conceits, when Men have cleared their understanding, by the light of Experience, will scatter, and break up like a Mist.

It is certain, that *Sound* is not produced at the first; but with some *Locall Motion* of the *Air*, or *Flame*; or some other *Medium*; Nor yet without some *Resistance*, either in the *Air*, or the *Body Percussed*. For if there be a meer Yeelding or Cession, it produceth no *Sound*; As hath been said. And therein *Sounds* differ from *Light*, and *Colours*; which pass through the *Air*, or other *Bodies*, without any *Locall Motion* of the *Air*; either at the first, or after. But you must attentively distinguish between the *Locall Motion*, of the *Air*, (which is but *Vehiculum causa*, a *Carrier of the Sounds*;) and the *Sounds* themselves, Conveighed in the *Air*. For as to the former, we see manifestly, that no *Sound* is produced (no not by *Air* it self against other *Air*, as in *Organs*, &c.) but with a perceptible *Blast* of the *Air*; and with some *Resistance* of the *Air* stricken. For, even all *Speech*, (which is one of the gentlest *Motions of Air*;) is with *Expulsion* of a little *Breath*. And all *Pipes* have a *Blast*, as well as a *Sound*. We see also manifestly, that *Sounds* are carried with *Wind*: And therefore *Sounds* will be heard further with the *Wind*, than against the *Wind*: and likewise do rise and fall with the *Intension* or *Remission* of the *Wind*. But for the *Impression* of the *Sound*, it is quite another Thing; And is utterly without any *Locall Motion* of the *Air*, Perceptible; And in that resembleth the *Species Visible*: for after a *Man* hath lured, or a *Bell* is rung, we cannot discern any *Perceptible Motion* (at all) in the *Air*, along as the *sound* goeth; but only at the first. Neither doth the *Wind* (as farre as it carrieth a *Voice*;) with the Motion thereof, confound any of the *Delicate*, and *Articulate* Figurations of the *Air*, in variety of Words. And if a *Man* speak a good loudness, against the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the mouth; as *F*, *S*, *V*; and some others. But *Gentle Breathing*, or *Blowing* without *Speaking*, will move the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Air*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Air* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation* of *Things invisible*; which (without all question) induce no *Locall Motion* in the *Air*, as hath been said.

Nevertheless it is true, that upon the *Noise* of *Thunder*, and great *Ordinance*; *Glass* windows will shake; and *Fishes* are thought to be frayed with

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with the Motion, caused by *Noise* upon the water. But these Effects are from the Locall Motion of the *Air*, which is a Concomitant of the *Sound*, (as hath been said;) and not from the *Sound*.

127 It hath been anciently reported, and is still received, that *Extreme applauses*, and *shouting of people* assembled in great Multitudes, have so rarified, and broken the *Air*, that Birds flying over, have fallen down, the *Air* being not able to support them. And it is beleev'd by some, that *great Ringing of Bells* in populous Cities, hath chased away *Thunder*: and also dissipated Pestilent *Air*: All which may be also from the Concussion of the *Air*, and not from the *Sound*.

128 A very great *Sound*, near hand, hath stricken many Deaf; And at the Instant they have found, as it were, the breaking of a Skin or Parchment in their Ear: And my self standing near one that *Lured* loud, and shrill, had suddenly an Offence, as if somewhat had broken, or been dislocated in my Ear; And immediately after a *loud Ringing*: (Not an ordinary Singing, or Hissing, but farre louder, and differing:) so as I feared some *Deafness*. But after some half Quarter of an Hour it vanished. This Effect may be truly referred unto the *Sound*: for (as is commonly received) an *over-potent Object* doth destroy the *sense*; And *spirituall Species*, (both *Visible* and *Audible*,) will work upon the Senfories, though they move not any other Body.

129 In *Delation of Sounds*, the Enclosure of them preserveth them, and causeth them to be heard further. And we find in rowles of Parchment, or Truncks, the Mouth being laid to the one end of the rowl of Parchment, or Trunck, and the *Ear* to the other, the *Sound* is heard much further, then in the *Open Air*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Air*; but in such Concaves it is conserved, and contracted. So also in a Peece of Ordnance, if you speak in the Touch-hole, and another lay his *Ear* to the Mouth of the Peece, the *Sound* passeth, and is farre better heard, than in the *Open Air*.

130 It is further to be considered, how it proveth and worketh, when the *Sound* is not enclosed all the Length of his way, but passeth partly through open *Air*; as where you *speak* some distance from a *Trunck*, or where the *Ear* is some distance from the *Trunck*, at the other End; or where both *Mouth* and *Ear* are distant from the *Trunck*. And it is tryed, that in a long *Trunck*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Ear* be a handfull, or more, from the Ends of the *Trunck*; And somewhat more holpen, when the *Ear* of the *Hearer* is near, than when the *Mouth* of the *Speaker*. And it is certain, that the *Voice* is better heard in a *Chamber* from *Abroad*, than *Abroad* from within the *Chamber*.

131 As the *Enclosure*, that is *Round about* and *Entire*, preserveth the *Sound*; so doth a *Semi-concave*, though in a less degree. And therefore, if you divide a *Trunck*, or a *Cane* into two, and one speak at the one end, and you lay your *Ear* at the other, it will carry the *Voice* further, than in the *Air* at large. Nay further, if it be not a full *Semi-concave*; but if you do the like upon the *Mast* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one speak upon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, then in the *Air* at large.

132 It would be tryed, how, and with what proportion of disadvantage, the *Voice* will be carried in an *Horn*, which is a line Arched; Or in a *Trumpet*, which is a line Retorted; Or in some *Pipe* that were *Sinuous*.

133

It is certain, (howsoever it cros the Received Opinion) that *Sounds* may be created without *Air*, though *Air* be the most favourable *Deferent* of *Sounds*. Take a *Vessel* of *Water*, and knap a pair of *Tongs* some depth within the *Water*, and you shall hear the *Sound* of the *Tongs* well, and not much diminished; And yet there is no *Air* at all present.

133

Take one *Vessel* of *Silver*, and another of *Wood*, and fill each of them full of *Water*, and then knap the *Tongs* together, as before, about an handfull from the *Bottom*, and you shall find the *Sound* much more Resounding from the *Vessel* of *Silver*, than from that of *Wood*: And yet if there be no water in the *Vessel*, so that you knap the *Tongs* in the *Air*; you shall find no difference between the *Silver* and the *Wooden Vessel*. Whereby, beside the main point of creating *Sound* without *Air*, you may collect two Things: The one, that the *Sound* communicateth with the *Bottom* of the *Vessel*: The other, that such a *Communication* passeth far better, thorow *Water* than *Air*.

134

Strike any *Hard Bodies* together, in the midst of a *Flame*, and you shall hear the *Sound* with little difference, from the *Sound* in the *Air*.

135

The *Pneumatical Part*, which is in all *Tangible Bodies*, and hath some *Affinity* with the *Air*; performeth, in some degree, the *Parts* of the *Air*; As when you knock upon an *Empty Barrell*, the *Sound* is (in part) created by the *Air* on the *Out-side*; And (in part) by the *Air* in the *Inside*; For the *Sound* will be greater or lesser, as the *Barrell* is more *Empty*, or more *Full*; But yet the *Sound* participateth also with the *Spirit* in the *Wood*, thorow which it passeth from the *Out-side* to the *Inside*: And so it cometh to pass in the *Chiming* of *Bels*, on the *Out-side*; where also the *Sound* passeth to the *Inside*: And a number of other like *Instances*, whereof we shall speak more when we handle the *Communication* of *Sounds*.

136

It were extreme *Grofsness* to think, (as we have partly touched before,) that the *Sound* in *Strings* is made, or produced, between the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula motus*, *Passages* to the *Creation* of the *Sound*, the *Sound* being produced between the *String* and the *Air*; And that not by any *Impulsion* of the *Air* from the first *motion* of the *String*; but by the *Return* or *Result* of the *String*, which was strained by the *Touch*, to his former *Place*: which *Motion* of *Result* is quick and sharp; Whereas the first *Motion* is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a *Continuall Trepidation*.

137

TAKE a *Trunck*, and let one whistle at the one *End*, and hold your *Eare* at the other, and you shall find the *Sound* strike so sharp, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it self in round; And so spendeth it Self; But if the *Sound*, which would scatter in *Open Air*, be made to go all into a *Canal*; It must needs give greater force to the *Sound*. And so you may note, that *Lnelofures*, do no not only preserve *Sounds*, but also encrease and sharpen it.

138

Experiments in Consort, touching the Magnitude, and Exility, and Dampwol Sounds.

A *Hunters Horn*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horn* were all of an equal *Bore*. The *Cause* is, for that the *Air* and *Sound*, being first contracted at the lesser *End*, and afterwards having more *Room* to spread at the greater *End*, do dilate themselves; And in coming out strike more *Air*; whereby the *Sound* is the Greater, and *Baser*. And even *Hunters Horns*, which are sometimes made straight, and not *Oblique*, are ever greater at the lower end. It would

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be tried also in *Pipes*, being made *far larger* at the lower End: Or being made with a *Belly* towards the lower End; And then issuing into a straight Concave again.

140 There is in *Saint James's Fields*, a *Conduit* of *Brick*, unto which joyneth a *low Vault*; And at the End of that, a *Round House* of *Stone*: And in the *Brick Conduit* there is a *Window*; And in the *Round House*, a *Slit* or *Rift* of some little breadth: if you cry out in the *Rift*, it will make a fearefull roaring at the *Window*. The *Cause* is the same with the former; For that all *Concaves*, that proceed from more *Narrow* to more *Broad*, do amplify the *Sound* at the *Coming* out.

141 *Hawks Bells*, that have *Holes* in the *Sides*, give a greater *Ring*, than if the *Pellet* did strike upon *Brass*, in the *Open Air*. The *Cause* is the same with the first *Instance* of the *Trunck*; Namely, for that the *Sound* Enclosed with the *Sides* of the *Bell*, cometh forth at the *Holes* unspent, and more strong.

142 In *Drums*, the *Clofeness* round about, that preserveth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, far more loud, and strong, than if you should strike upon the like *Skin*, extended in the *Open Air*. The *Cause* is the same with the two precedent.

143 *Sounds* are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noon*, or in the day. The *Cause* is, for that in the *Day*, when the *Air* is more *Thin*, (no doubt) the *Sound* pierceth better; But when the *Air* is more *Thick* (as in the *Night*) the *Sound* spendeth and spreadeth abroad less: And so it is a *Degree* of *Enclosure*. As for the *Night*, it is true also, that the *Generall Silence* helpeth.

144 There be two kinds of *Reflexions* of *Sounds*; the one at *Distance*, which is the *Eccho*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly, Of which we shall speak hereafter: The other in *Concurrence*, When the *Sound* Reflecting (the *Reflexion* being near at hand) returneth immediatly upon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musick* upon the *Water* soundeth more; And so likewise *Musick* is better in *Chambers* Wainscotted, than Hanged,

145 The *Strings* of a *Lute* or *Violl*, or *Virginals*, do give a farre greater *Sound*, by reason of the *Knot* and *Board*, and *Concave* underneath, than if there were nothing but only the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the *Upper Air* into the *Lower*. The *Cause* is, the *Communication* of the *Upper Air* with the *Lower*; And penning of both from *Expende*, or *Dispersing*.

146 An *Irish Harp* hath *Open Air* on both sides of the *Strings*: And it hath the *Concave* or *Belly*, not along the *Strings* but at the End of the *Strings*. It maketh a more *Resounding Sound*, than a *Bandora*, *Orpharion*, or *Cittern*, which have likewise *Wire-strings*. I judge the *Cause* to be, for that *Open Air* on both *Sides* helpeth, so that there be a *Concave*; Which is therefore best placed at the End.

147 In a *Virginnall*, when the *Lid* is down, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cause* is, for that all *Shutting in* of *Air*, where there is no competent *Vent*, dampeth the *Sound*: Which maintaineth likewise the former *Instance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Air* somewhat.

148 There is a *Church* at *Glocester*, (and as I have heard the like is in some other places,) where if you speak against a *Wall*, softly, another shall hear your *Voice* better a good way off, than near hand. Enquire more particularly of the *Fame* of that place. I suppose there is some *Vault*, or *Hollow*,

Hollow, or Isle, behind the Wall, and some Passage to it towards the further end of that Wall, against which you speak; So as the *Voice* of him that speaketh, slideth along the Wall, and then entrench at some Passage, and communicateth with the *Air* of the Hollow; For it is preserved somewhat by the plain Wall; but that is too weak to give a *Sound* Audible, till it hath communicated with the back *Air*.

Strike upon a *Bow-string*, and lay the *Horn* of the *Bow* near your Ear, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the Sensory, by reason of the Close Holding, is percussed, before the *Air* disperseth. The like is, if you hold the *Horn* betwixt your Teeth. But that is a plain *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse between those two Parts; As appeareth by this; That a harsh *grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horn* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Ear.

149

If you take a *Rod* of *Iron*, or *Brass*, and hold the one end to your Ear, and strike upon the other, it maketh a far greater *Sound*, than the like Stroke upon the *Rod*, not made so Contiguous to the Ear. By which, and by some other *Instances*, that have been partly touched, it should appear; That *Sounds* do not only slide upon the Surface of a Smooth Body, but do also communicate with the Spirits, that are in the Pores of the Body.

150

I remember in *Trinity-Colledge* in *Cambridge*, there was an *Upper Chamber*, which being thought weak in the Roof of it, was supported by a Pillar of *Iron*, of the bigness of ones Arm, in the midst of the *Chamber*; which if you had struck, it would make a little flat Noise in the *Room* where it was struck; But it would make a great Bomb in the *Chamber* beneath.

151

The *Sound* which is made by *Buckets* in a *Well*, when they touch upon the *Water*; Or when they strike upon the side of the *Well*: Or when two *Buckets* dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Air*. The *Cause* is the Penning and Enclosure of the *Air*, in the Concave of the *Well*.

152

Barrels placed in a Room under the Floor of a *Chamber*, make all *Noises* in the same Chamber, more full and Resounding.

153

So that there be five ways (in generall) of Majoration of *Sounds*: Enclosure Simple; Enclosure ith Dilatation; Communication; Reflexion Concurrent; and Approach to the Sensory.

For *Exility* of the *Voice*, or other *Sounds*: It is certain, that the *Voice* doth pass thorow *Solid* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Close Body; and such an one, as letteth not in *Air*. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weakness*, or *Exility*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no *Ring*, but a flat Noise, or Rattle. And so doth the *Artes* or *Eagles Stone*, which hath a little Stone within it.

154

And as for *Water*, it is a certain Triall: Let a man go into a *Bath*, and take a *Pail*, and turn the Bottome upward, and carry the Mouth of it (Even,) down to the Levell of the *Water*, and so press it down under the *Water*, some handfull and an half, still keeping it even, that it may not tilt on either side, and so the *Air* get out: Then let him that is in the *Bath*, dive with his Head so far under *Water*, as he may put his Head into the *Pail*, and there will come as much *Air* bubling forth, as will make Room for his Head. Then let him speak, and any that shall stand without, shall hear his *Voice* plainly; but yet made extreme sharp and exile, like the *Voice* of

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Puppets: But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handsomely done, if the *Pail* be put over the *Mans head* above *Water*, and then he cower down, and the *Pail* be pressed down with him. Note that a *Man* must kneel or sit, that he may be lower than the *Water*, A man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith, That *Hercules's Page Hylas* went with a *Water-pot*, to fill it at a pleasant *Fountain*, that was near the *Shore*, and that the *Nymphs* of the *Fountain* fell in love with the *Boy*, and pulled him under *Water*, keeping him alive; And that *Hercules* missing his *Page*, called him by his Name aloud, that all the *Shore* rang of it; And that *Hylas* from within the *Water*, answered his *Master*; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had been three Miles off, when the *Fountain* (indeed) was fast by.

156 In *Lutes*, and *Instruments of Strings*, if you stop a *String* high, (whereby it hath less Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and strike the *Edge* of the one against the *Bottom* of the other, within a *Pail of Water*; And you shall find, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; even while Part of the *Sawcer* is above the *Water*; But that *Flatness of Sound* is joined with a harshness of *Sound*; which (no doubt) is caused by the inequality of the *Sound*, which cometh from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becometh more clear; but far more low; And as if the *Sound* came from a far off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*: And if a *Bell* hath *Cloth* or *Silk* wrapped about it, it deadeth the *Sound* more, than if it were *Wood*. And therefore in *Clericalls*, the *Keyes* are lined; And in *Colledges* they use to line the *Tablemen*.

159 Triall was made in a *Recorder*, after these severall manners. The *Bottom* of it was set against the *Palm* of the *Hand*; stopped with *Wax* round about, set against a *Damask Cushion*; Thrust into *Sand*; into *Ashes*; into *Water*, (half an *Inch* under the *Water*;) Close to the *Bottom* of a *Silver Basin*; And still the *Tone* remained: But the *Bottom* of it was set against a *Wollen Carpet*; A *Lining of Plush*; A *Lock of Wooll*, (though loosely put in;) Against *Snow*; And the sound of it was quite deaded, and but *Breath*.

160 *Iron* Hot produceth not so full a *Sound*, as when it is *Cold*; For while it is hot, it appeareth to be more *Soft*, and less *Resounding*. So likewise *Warm Water*, when it falleth, maketh not so full a *Sound*, as *Cold*: And I conceive it is softer, and nearer the *Nature* of *Oil*; For it is more slippery, As may be perceived, in that it scowreth better.

161 Let there be a *Recorder* made, with two *Fipples*, at each end one, The *Trunck* of it of the length of two *Recorders*, and the *Holes* answerable towards each end; And let two play the same *Lesson* upon it, at an *Unison*; And let it be noted whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Cross* be made, of two *Trunks* (thorowout) hollow; And let two speak, or sing, the one long ways, the other *traverse*: And let two hear at the the opposit *Ends*; And note, whether the *Sound* be confounded; amplified; or dulled: Which two *Instances* will also give light to the *Mixture of Sounds*; whereof we shall speak hereafter.

162 A *Bellows*, blown into the *Hole* of a *Drum*, and the *Drum* then stricken, maketh

maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindereth the Issue of the *Sound*; And partly for that it maketh the *Air*, being blown together, less moveable.

The *Loudness* and *Softness* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exility* of *Sounds*; For a *Base String*, though softly stricken, giveth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Air*; and the *Treble* less *Air*, but with a sharper Percussion.

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudness* or *Softness* of *Sounds*: As in knocking harder or softer, Winding of a Horn stronger or weaker; Ringing of a Hand-bell harder or softer, &c. And the *Strength* of this *Percussion*, consisteth, as much, or more in the *Hardness* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a Cloth, it will give a less *sound*; If against Wood, a greater; If against a Metall, yet a greater; And in Metals, if you strike against Gold; (which is the more pliant,) it giveth the flatter *Sound*; If against Silver or Brass, the more Ringing *Sound*. As for *Air*, where it is strongly pent, it matcheth a *Hard Body*. And therefore we see in discharging of a *Peece*, what a great Noise it maketh. We see also, that the Charge with Bullet; Or with Paper wet, and hard stopped; Or with Powder alone, rammed in hard; maketh no great difference in the *Loudness* of the Report.

The *Sharpness* or *Quickness* of the *Percussion*, is a great *Cause* of the *Loudness*, as well as the *Strength*: As in a Whip or Wand, if you strike the *Air* with it; the Sharper and Quicker you strike it, the *Louder Sound* it giveth. And in playing upon the *Lute*, or *Virginalls*, the quick Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quick Striking cutteth the *Air* speedily; whereas the Soft Striking doth rather beat, than cut.

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Empty Vessels, &c.) hath been touched obiter, in the Majoration of *Sounds*: But it is fit also to make a *Title* of it apart.

The *Experiment* for greatest Demonstration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you strike with a Hammer upon the Upper Part, and then upon the Midst, and then upon the Lower, you shall find the *Sound* to be more Treble, and more Base, according unto the Concave, on the Inside: though the Percussion be only on the Outside.

When the *Sound* is created between the *Blast* of the *Mouth*, and the *Air* of the *Pipe*, it hath nevertheless some *Communication* with the Matter of the Sides of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of Wood, and Brass, the *Sound* will be diverse; So if the *Pipe* be covered with Cloth, or Silk, it will give a diverse *Sound*, from that it would do of it self; So, if the *Pipe* be a little wet on the *Inside*, it will make a differing *Sound*, from the same *Pipe* dry.

That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Air*, it doth with *Air*; Vide *Experimentum*, 134.

We have spoken before (in the *Inquisition* touching *Musick*;) of *Musicall Sounds*, whereunto there may be a Concord or

Experiments in Consort, touching the Loudness, or Softness of Sounds; and their Carriage at longer or shorter Distance

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Experiments in Consort touching the Communication of Sounds.

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Experiments in Consort touching Equality, and Inequality of Sounds.

Discord into two Parts; which Sounds we call *Tones*; And likewise of *Immuscicall Sounds*; And have given the Cause, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And we have also expressed there, what are the *Equall Bodies* that give *Tones*, and what are the *Unequall* that give none. But now we shall speak of such *Inequality of Sounds*, as proceedeth, not from the Nature of the Bodies themselves, but is *Accidentall*, Either from the *Roughness*, or *Obliquity* of the *Passage*, or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it have a *Rift* in it, whereby the *Sound* hath not a clear *Passage*, giveth a *Hoarse* and *Farring Sound*; So the *Voice of Man*, when by Cold taken the *Wefill* groweth rugged, and (as we call it) furred, becometh hoarse. And in these two *Instances* the *Sounds* are *Ingrate*; because they are merely *Unequall*: But, if they be *Unequall* in *Equality*, then the *Sound* is *Gratefull*, but *Purling*.

170 All *Instruments*, that have either *Returnes*, as *Trumpets*; Or *Flexions*, as *Cornets*; Or are *Drawn up*, and *put from*, as *Sackbuts*; have a *Purling Sound*: But the *Recorder*, or *Flute*, that have none of these *Inequalities*, give a clear *Sound*. Nevertheless, the *Recorder* if self, or *Pipe* moistened a little in the *Inside*, soundeth more solemnly, and with a little *Purling*, or *Hissing*. Again, a *Wreathed String*, such as are in the *Base Strings* of *Bandoraes*, giveth also a *Purling Sound*,

171 But a *Lute-string*, if it be merely *Unequall* in his *Parts*, giveth a *Harsh* and *Untuneable Sound*; which *Strings* we call *False*, being bigger in one *Place* than in another, And therefore *Wire-strings* are never *False*. We see also, that when we try a *False Lute-string*, we use to extend it hard between the *Fingers*, and to filip it; And if it giveth a double *Species*, it is *True*; But if it giveth a *treble*, or more, it is *False*.

172 *Waters*, in the *Noise* they make as they runne, represent to the *Ear* a *Trembling Noise*; And in *Regals* (where they have a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall *Trembling*: And *Children* have also little *Things* they call *Cocks*, which have *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling of Water*, hath an affinity with the *Letter L*. All which *Inequalities of Trepidation*, are rather pleasant, than otherwise.

173 All *Base Notes*, or very *Treble Notes*, give an *Asper Sound*; For that the *Base* striketh more *Air*, than it can well strike equally: And the *Treble* cutteth the *Air* so sharp, as it returneth too swift, to make the *Sound* *Equall*: And therefore a *Mean*, or *Tenor*, is the sweetest *Part*.

174 We know Nothing, that can at pleasure make a *Muscicall*, or *Immuscicall Sound*, by voluntary *Motion*, but the *Voice of Man*, and *Birds*. The Cause is, (no doubt) in the *Weasill* or *Wind-Pipe*, (which we call *Aspera Arteria*), which being well extended, gathereth *Equality*; As a *Bladder* that is wrinkled, if it be extended, becometh smooth. The *Extension* is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can never give a *Tone*: And in *Ringing*, there is (manifestly) a greater *Working* and *Labour* of the *Throat*, than in *Speaking*; as appeareth in

in the Thrusting out, or Drawing in of the Chin, when we sing.

The *Humming of Bees*, is an *Unequall Bzzzing*, and is conceived, by some of the Ancients, not to come forth at their Mouth, but to be an *Inward Sound*: but (it may be) it is neither; but from the motion of their Wings; For it is not heard but when they stirre.

All *Metalls quenched in Water*, give a *Sibilation* or *Hissing sound*; (which hath an *Affinity* with the letter *Z*.) notwithstanding the *Sound* be created between the *Water* or *Vapour*, and the *Air*. *Seething* also, if there be but small store of *Water*, in a *Vessell*, giveth a *Hissing Sound*; but *Boyling* in a full *Vessell*, giveth a *Bubling Sound*, drawing somewhat near to the *Cocks* used by *Children*.

Triall would be made, whether the *Inequality*, or *Interchange* of the *Medium*, will not produce an *Inequality of Sound*; as if three *Bells* were made one within another, and *Air* betwixt each; and then the outermost *Bell* were chimed with a *Hammer*, how the *Sound* would differ from a *Simple Bell*. So likewise take a *Plate of Brass*, and a *Planck of Wood*, and joyn them close together, and knock upon one of them, and see if they do not give an *unequall Sound*. So make two or three *Partitions of Wood* in a *Hogshhead*, with *Holes* or *Knots* in them; And mark the difference of their *Sound*, from the *Sound* of an *Hogshhead*, without such *Partitions*.

IT is evident, that the *Percussion* of the *Greater Quantity of Air*, causeth the *Baser Sound*; And the less *Quantity*, the more *Treble sound*. The *Percussion* of the *Greater Quantity of Air* is produced by the *Greatness of the Body Percussing*; by the *Latitude of the Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater bore then a *Treble*; And in *Pipes*, and thelike, the lower the *Note Holes* be, and the further off from the *Mouth of the Pipe*, the more *Base Sound* they yeeld; and the neerer the *Mouth* the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron of Brass*, at the *Top*, it maketh a more *Treble Sound*; and at the *Bottom* a *Baser*.

It is also evident, that the *Sharper* or *Quicker Percussion of Air* causeth the more *Treble Sound*, and the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*; the more they are wound up, and strained; (And thereby give a more quick *Start* back;) the more *Treble* is the *Sound*. And the slacker they are, or less wound up, the *Baser* is the *Sound*. And therefore a bigger *String* more strained, and a lesser *String*, less strained, may fall into the same *Tone*.

Children, *Women*, *Eunuchs* have more small and shrill *Voices*, than *Men*. The Reason is, not for that *Men* have greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudness* or *Softness*, but not in the *Tone*;) but from the *Dilatation* of the *Organ*; which (it is true) is likewise caused by Heat. But the Cause of *Changing the Voice*, at the yeares of *Puberty*, is more obscure. It seemeth to be, for that when much of the *Moisture* of the *Body*, which did before irrigate the *Parts*, is drawn down to the *Spermatick vessels*; it leaveth the *Body* more hot then it was; whence cometh the *Dilatation* of the *Pipes*: For we see plainly, all *Effects of Heat*, do then come on; As *Pilosity*, more *Roughness* of the *Skin*, *Hardness* of the *Flesh*, &c.

The *Industry* of the *Muscian*, hath produced two other Means of *Straining*, or *Intension of Strings*, besides their *Winding up*. The one is the *Stopping* of

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Experiments
in Consort
touching the
more Treble,
and the more
Base Tones, or
Musical
Sounds.

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of the *String* with the *Finger*; As in the Necks of Lutes, Viols, &c. The other is the *Shortness* of the *String*; As in Harps, Virginalls &c. Both these have one, and the same reason; For they cause the *String* to give a quicker Start.

182 In the *Straining* of a *String*, the further it is strained, the less *Superstraining* goeth to a *Note*; For it requireth good Winding of a *String*, before it will make any *Note* at all: And in the Stops of Lutes, &c. the higher they go, the less Distance is between the Frets.

183 If you fill a *Drinking Glass* with *Water*, (especially one Sharp below, and Wide above,) and Fillip upon the Brim, or Out side; And after, empty Part of the *Water*, and so more and more, and still try the *Tone* by Fillipping; you shall find the *Tone* fall, and be more *Base*, as the *Glass* is more Empty.

Experiments
in Confort
touching the
Proportion of
Treble and
Base Tones.

The Just and Measured *Proportion* of the *Air Percussed*, towards the *Baseness* or *Trebleness* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discovereth the true *Coincidence* of *Tones* into *Diapasons*: Which is the Return of the same *Sound*. And so of the *Concords* and *Discords*, between the *unison*, and *Diapason*, Which we have touched before, in the *Experiments* of *Musick*; but think fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may be found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But most commodiously in the last of these.

184 Try therefore the *Winding* of a *String* once about, as soon as it is brought to that Extension, as will give a *Tone*; And then of twice about; And thrice about, &c. And mark the Scale or Difference of the Rise of the *Tone*: Whereby you shall discover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimension* of the *Winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or less strained. But note that to measure this, the way will be, to take the Length in a right Line of the *String*, upon any *Winding* about of the Peg.

185 As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first Stop of the *String*, unto such a Stop as shall produce a *Diapason* to the former Stop, upon the same *String*,

186 But it will best (as it is said) appear, in the *Bores* of *Wind-Instruments*: And therefore cause some half dozen *Pipes*, to be made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so mark what Fall of *Tone* every one giveth. But still in these three last *Instances*, you must diligently observe; what *Length* of *String*, or *Distance* of *Stop*, or *Concave* of *Air*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giveth the aptest demonstration,) you must set down what *Encrease* of *Concave* goeth to the making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so up to the *Diapason*: For then the great Secret of *Numbers* and *Proportions*, will appear: It is not unlikely, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-founders* in fitting the

the tune of their *Bells*. So that Enquiry may save Triall, Surely, it hath been observed by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapason* to the *Sound* of the like *Barrell-full*; But how that should be, I do not well understand; For that the knocking of a *Barrell, Full or Empty*, doth scarce give any *Tone*.

There is required some sensible *Difference* in the *Proportion* of creating a *Note*, towards the *Sound* it self, which is the *Passive*: And that it be not too near, but at a distance. For in a *Recorder*, the three uppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the *Winding* or *Stopping* of *Strings*.

There is another *Difference* of *Sounds*, which we will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musical*, nor *Immusical*: Though it be true, that there can be no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may be both *Musical* and *Immusical*. We shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that we mean) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

In *Speech* of *Man*, the *Whispering*, which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking* out, is an *Exteriour Sound*; And therefore you can never make a *Tone*, nor sing in *Whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellows*, or *Wind*, (though lowd) is an *Interiour Sound*; But the *Blowing* thorrow a *Pipe*, or *Concave*, (though soft) is an *Exteriour*. So likewise the greatest *Winds*, if they have no *Coarctation*, or blow not hollow, give any *Interiour Sound*; The *Whistling* or hollow *Wind* yeeldeth a *Singing*, or *Exteriour Sound*; The former being pent by some other *Body*; The latter being pent in by his own *Density*: And therefore we see, that when the *Wind* bloweth hollow, it is a *Sign* of *Rain*. The *Flame*, as it moveth within it self, or is blown by a *Bellows*, giveth a *Murmur* or *Interiour Sound*.

There is no *Hard Body*, but struck against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: Infomuch as if the *Percussion* be over-soft, it may induce a *Nullity* of *Sound*; But never an *Interiour Sound*; As when one treadeth so softly, that he is not heard.

Where the *Air* is the *Percutient*, pent, or not pent, against a *Hard Body*, it never giveth an *Exteriour Sound*; As if you blow strongly with a *Bellows* against a *Wall*.

Sounds (both *Exteriour* and *Interiour*,) may be made, as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

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Experiments
in Confort
touching *Ex-
teriour*, and *Inter-
iour* Sounds.

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Experimente
in Confort
touching Ar-
ticulations of
Sounds.

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IT is evident and it is one of the strangest Secrets in Sounds: that the whole Sound is not in the whole Air only; But the whole Sound is also in every small Part of the Air. So that all the curious Diversitie of Articulate Sounds of the Voice of Man, or Birds, will enter into a small Crany, Inconfused.

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The Unequall Agitation of the Winds, and the like, though they be material to the Carriage of the Sounds, further or less way; yet they do not confound the Articulation of them at all, within that distance that they can be heard; Though it may be, they make them to be heard less Way, than in a Still; as hath been partly touched.

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Over-great Distance confoundeth the Articulation of Sounds; As we see, that you may hear the Sound of a Preachers voice, or the like, when you cannot distinguish what he saith. And one Articulate Sound will confound another; as when many speak at once.

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In the Experiment of Speaking under Water, when the Voice is reduced to such an Extreme Exility, yet the Articulate Sounds, (which are the Words) are not confounded; as hath been said.

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I conceive, that an Extreme Small, or an Extreme Great Sound, cannot be Articulate; But that the Articulation requireth a Mediocrity of Sound: For that the Extreme Small Sound confoundeth the Articulation by Contracting; And the Great Sound, by Dispersing: And although (as was formerly said) a Sound Articulate, already created, will be contracted into a small Crany yet the first Articulation requireth more Dimension.

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It hath been observed, that in a Room, or in a Chapell, Vaulted below, and Vaulted likewise in the Roof, a Preacher cannot be heard so well, as in the like Places not so Vaulted. The Cause is, for that the Subsequent Words come on, before the Precedent Words vanish: And therefore the Articulate Sounds are more confused, though the Gros of the Sound be greater.

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The Motions of the Tongue, Lips, Throat, Palate, &c. which go to the Making of the severall Alphabeticall Letters, are worthy Enquiry, and pertinent to the present Inquisition of Sounds: But because they are subtill, and long to describe, we will refer them over, and place them amongst the Experiments of Speech. The Hebrewes have been diligent in it, and have assigned, which Letters are Labiall, which Dentall, which Gutturall, &c. As for the Latines, and Grecians, they have distinguished between Semi-vowels, and Mutes; And in Mutes, between Mute Tenues, Mediae, and Aspirate; Not amiss; But yet not diligently enough. For the speciall Strokes, and Motions, that create those Sounds, they have little enquired: As that the Letters, B. P. F. M. are not expressed, but with the Contracting, or Shutting of the Mouth; That the Letters N. and B. cannot be pronounced, but that the Letter, N. will turn into M. As Hecatonba, will be Hecatomba. That M. and T. cannot be pronounced together; but P. will come between; as Emptus, is pronounced Emptus; And a number of the like. So that if you enquire to the full; you will find, that to the Making of the whole Alphabet, there will be fewer Simple Motions required, than there are Letters.

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The Lungs are the most Spongy Part of the Body; And therefore ablest to contract, and dilate it self; And where it contracteth it self, it expelleth the Air; which thorow the Artire, Throat, and Mouth, maketh the Voice: But yet Articulation is not made, but with the

the help of the *Tongue*, *Palat*, and the rest of those they call *Instruments* of *voyce*.

There is found a Similitude, between the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that have no *Voyce Articulate*; and divers *Letters of Articulate Voyces*: And commonly Men have given such Names to those *Sounds*, as do allude unto the Articulate Letters. As *Trembling of Water* hath Resemblance with the *Letter L*: *Quenching of Hot Metalls*, with the *Letter Z*: *Snarling of Dogs*, with the *Letter R*: The *Noise of Scritch-Owles*, with the *Letter Sh*: *Voyce of Cats*, with the *Diphthong Eu*: *Voyce of Cuckoes*, with the *Diphthong Ou*: *Sounds of Strings*, with the *Letter Ng*: So that if a Man, (for Curiosity, or Strangeness sake,) would make a *Puppet* or other *Dead Body*, to pronounce a *Word*; Let him consider, on the one Part, the Motion of the *Instruments of Voyce*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that causeth the Similitude of *Sounds*; And by that he may minister light to that Effect.

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N A T U R A L L



NATURALL HISTORY.

III. Century.



ALL *Sounds* (whatsoever) move Round; That is to say; On all *Sides*; *Upwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

Sounds do not require to be conveyed to the *Sense*, in a *Right Line*, as *Visibles* do, but may be *Arched*; Though it be true, they move strongest in a *Right Line*; Which nevertheless is not caused by the *Rightness* of the *Line*, but by the Shortness of the distance; *Linea recta brevissima*. And therefore we see, if a *Wall* be between, and you speak on the one *Side*, you hear it on the other; Which is not because the *Sound* Passeth thorow the *Wall*; but *Archeth* over the *Wall*.

If the *Sound* be *Stopped* and *Repercussed*, it cometh about on the other *Side*, in an *Oblique Line*. So, if in a *Coach*, one side of the *Boot* be down, and the other up; And a *Begger* beg on the *Closet Side*; you would think that he were on the *Open Side*. Solikewise, if a *Bell* or *Clock*, be (for Example) on the *North side* of a *Chamber*; And the *Window* of that *Chamber* be upon the *South*; He that is in the *Chamber* will think the *Sound* came from the *South*.

Sounds, though they *spread round*, (so that there is an *Orbe*, or *Sphericall Area* of the *Sound*;) yet they move strongest, and go furthest in the *Fore-Lines*, from the first *Locall Impulsion* of the *Air*. And therefore in *Preaching*, you shall hear the *Preachers Voice*, better, before the *Pulpit*, than behind it, or on the *Sides*, though it stand open. So a *Harquebuz*, or *Ordinance*, will be further heard, forwards, from the *Mouth* of the *Peerce*, than backwards, or on the *Sides*.

It may be doubted, that *Sounds* do move better *Downwards*, than *Upwards*. *Pulpits* are placed high above the people. And when the *Ancient Generals* spake to their *Armies*, they had ever a *Mount* of *Turfe* cast up, whereupon they stood: But this may be imputed to the *Stops* and *Obstacles*, which the voice meeteth with, when one speaketh upon the *levell*. But there

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Experiments
in Confort
touching the
Motions of
Sounds, in
what *Lines*
they are
Circular, *Ob-*
lique, *Straight*;
Upwards,
Downwards;
Forwards,
Backwards.

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there seemeth to be more in it: For it may be, that *Spiritual Species*, both of *Things Visible*, and *Sounds* do move better *Downwards*, than *Upwards*. It is a strange Thing that to Men standing below on the Ground, those that be on the Top of Paults, seem much less than they are, and cannot be known; But to Men above, those below seem nothing so much lessened, and may be known: yet it is true, that all things to them above, seem also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Upper window, or Tarras.

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But to make an exact Triall of it, let a Man stand in a *Chamber*, not much above the Ground, and speak out at the window, throw a *Trunk*, to one standing on the Ground, as softly as he can, the other laying his Ear close to the *Trunk*: Then *via versa*, let the other speak below keeping the same Proportion of Softness; And let him in the *Chamber* lay his Ear to the *Trunk*. And this may be the aptest Meanes, to make a Judgement, whether *Sounds* descend, or ascend, better.

Experiments
in Consort,
touching the
Lasting and
Perishing of
Sounds; And
touching the
Time they re-
quire to the
Generation, or
Dilatation.

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After that *Sound* is created, (which is in a moment,) we find it continueth some small time, melting by little and little. In this there is a wonderfull Error amongst Men, who take this to be a *Continuance* of the First *Sound*: whereas (in truth) it is a *Renovation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Air*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String stricken, which is thought to be a *Continuance*, ceaseth as soon as the Bell or String are touched. As in a *Virginal*, as soon as ever the Jack falleth, and toucheth the String, the *Sound* ceaseth; And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish that there are two *Trepidations*: The one Manifest, and Local, As of the Bell, when it is Penfile: The other Secret, of the Minute Parts; such as is described in the ninth Instance. But it is true, that the *Local* helpeth the *Secret* greatly. We see likewise that in Pipes, and other wind Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true that in Organs, there is a confused Murmur for a while, after you have played; But that is but while the Bellows are in Falling.

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It is certain, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will be carried, (at the least) twenty Miles upon the land, and much further upon the Water. But then it will come to the Ear; Not in the Instant of the Shooting off, but it will come an Hour, or more later. This must needs be a *Continuance* of the First *Sound*; For there is no *Trepidation* which should renew it. And the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more then Momentary.

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To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and have with him a Taper; And let some veil be put before the Taper; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same instant withdraw the Veile; And so let him in the Field tell by his Pulse what distance of *Time* there is between the *Light seene*, and the *Sound heard*: for it is certain that the *Delation* of Light is in an Instant. This may be tried in far greater Distances, allowing greater *Lights* and *Sounds*.

210

It is generally known and observed, that *Light*, and the *Object* of *Sight*, move swifter than *Sound*; For we see the *Flash* of a Peece is seen sooner, than

than the *Noise* is heard: And in Hewing Wood, if one be some distance off, he shall see the Arme lifted up for a second Stroke, before he hear the *Noise* of the first. And the greater the Distance, the greater is the Prevention: As we see in Thunder, which is farre off; where the Lightning precedeth the Crack a good space.

Colours, when they represent themselves to the Eie, fade not, nor melt not by Degrees, but appear still in the same strength; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Air*; but *Sounds* do. And it is a plain Argument, that *Sound* participateth of some *Locall Motion*, of the *Air*, (as a Cause *Sine quâ non*), in that, it perisheth so suddenly; For in every Section, or Impulsion of the *Air*, the *Air* doth suddenly restore and reunite it self; which the *Water* also doth, but nothing so swiftly.

In the Trials of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing by the sides* of a *Body*, for the *Passing thorow* a *Body*: and therefore you must make the *Intercepting Body* very close; For *Sound* will pass thorow a small Chinck.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*, thorow a *Wall*; thorow *Metall*, as in Hawkes Bels stopped, &c.) the *Hard* or *Close Body*, must be but thinne and small; For else it deadeth and extinguisheth the *Sound* utterly. And therefore, in the *Experiment* of *Speaking in Air under Water*, the voice must not be very deep within the *Water*: For then the *Sound* pierceth not. So if you speak on the further side of a *Close Wall*, if the *Wall* be very thick, you shall not be heard: And if there were an Hogthead empty, whereof the Sides were some two Foot thick, and the Bung-hole stopped: I conceive the Refounding *Sound*, by the *Communication* of the *Outward Air*, with the *Air within*, would be little or none: but only you shall hear the *Noise* of the *Outward Knock*, as if the *Vessell* were full.

It is certain, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the *Hard body* it self, doth cooperate; But much better, when the *Sides* of that *Hard Body* are struck, than when the *Percussion* is only within, without Touch of the *Sides*. Take therefore a Hawkes Bell, the holes stopped up, and hang it by a thread, within a *Bottle-Glass*; And stop the Mouth of the *Glass*, very close with *Wax*, and then shake the *Glass*, and see whether the *Bell* give any *Sound* at all, or how weak? But note, that you must in stead of the *Thread*, take a *Wire*; or else let the *Glass* have a great *Belly*; lest when you shake the *Bell*, it dash upon the *Sides* of the *Glass*.

It is plain that a very *Long*, and *Down-right Arch*, for the *Sound* to pass, will extinguish the *Sound* quiet; So that that *Sound*, which would be heard over a *Wall*, will not be heard over a *Church*; Nor that *Sound*, which will be heard, if you stand some distance from the wall, will be heard if you stand close under the *Wall*.

Soft and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; For the striking against *Cloth*, or *Furre*, will make little *Sound*; As hath been said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As we see, that *Curtaines*, and *Hangings*, will not stay the *Sound* much; But *Glass-windowes*, if they be very *Close*, will check a

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Experiments in Consonance touching the Passage and Interceptions of Sounds.

212

213

214

215

Sound more, than the like Thickness of Cloth. We see also, in the Rumbling of the Belly, how easily the Sound passeth thorow the Guts, and Skin.

216

It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bells) become not more *Weak* and *Exile*, when they pass thorow *Small Cranies*. For the *Subtilties* of *Articulate Sounds*, (it may be) may pass thorow *Small Cranies*, not confus'd; But the *Magnitude* of the *Sound* (perhaps,) not so well.

Experiments
in Consort
touching the
Medium of
Sounds.

217

THe *Mediums* of *Sounds* are *Air*; *Soft* and *Porous Bodies*; Also *Water*, And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and unapt *Deferents*, except the *Air*.

218

In *Air*, the *Thinner* or *Drier Air*, carrieth not the *Sound* so well, as the more *Dense*; As appeareth in *Night Sounds*; And *Evening Sounds*; And *Sounds* in moist *Weather*, and *Southern Winds*. The reason is already mentioned in the *Title* of *Majoration* of *Sounds*; Being, for that *Thin Air* is better pierced; but *Thick Air* preserveth the *Sound* better from *Waste*; Let further *Trials* be made by *Hollowing* in *Mists*, and *Gentle Showers*: For (it may be) that will somewhat dead the *Sound*.

219

How farre forth *Flame* may be a *Medium* of *Sounds*, (especially of such *Sounds* as are created by *Air*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is between; But then you must allow for some disturbance, the *Noise* that the *Flame* it self maketh.

220

Whether any other *Liquours*, being made *Mediums*, cause a diversity of *Sound* from *Water*, it may be tried: As by the *Knapping* of the *Tongs*; Or *Striking* the *Bottom* of a *Vessell*, filled either with *Milk*, or with *Oil*; which though they be more light, yet are they more unequal *Bodies* than *Air*.

Of the *Natures* of the *Mediums*, we have now *Spoken*; As for the *Disposition* of the *said Mediums*, it doth consist in the *Penning*, or not *Penning* of the *Air*; Of which we have *Spoken* before, in the *Title* of *Delation* of *Sounds*: It consisteth also in the *Figure* of the *Concave*, through which it passeth; of which we will *Speak* next.

Experiments
in Consort
what the *Figures* of the
Pipes or *Concaves*, or the
Bodies deferent
conduce to the
Sounds.

How the *Figures* of *Pipes*, or *Concaves*, through which *Sounds* pass; Or of other *Bodies* deferent: conduce to the variety and *Alteration* of the *Sounds*: Either in respect of the *Greater Quantity*, or *less Quantity* of *Air*, which the *Concaves* receive; Or in respect of the *Carrying* of *Sounds* longer or shorter way; Or in respect of many other *Circumstances*, they have been touched, as falling into other *Titles*. But those *Figures*, which we now are to speak of, we intend to be, as they concern the *Lines*, through which *Sound* passeth; As *Straight*; *Crooked*; *Angular*; *Circular*; &c.

221

The *Figure* of a *Bell* partaketh of the *Pyramis*, but yet coming off, and dilating more suddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they have likewise *Straight Hornes*: which if they be of the same *Bore* with the *Oblique*, differ little in *Sound*: save that the *Straight* require somewhat a stronger *Blast*. The *Figure* of *Recorders*, and *Flutes*, and *Pipes* are *straight*; But the *Recorder* hath a less *Bore*, and a greater; *Above*, and *below*. The *Trumpet* hath the *Figure* of the *Letter S*: which maketh that

Purling

Purling *Sound*, &c. Generally, the *Straight Line* hath the cleaneſt and roundeſt *Sound*, And the *Crooked* the more *Hoarſe*, and Jarring.

Of a *Sinuouſ Pipe*, that may have ſome four Flexions, Triall would be made. Likewise of a *Pipe*, made like a *Croſſ*, open in the middeſt. And ſo likewiſe of an *Angular Pipe*: And ſee what will be the Effects of theſe ſeverall *Sounds*. And ſo again of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you ſhall blow; And another Hole not farre from that; But with a *Traverſe* or *Stop* between them; So that your *Breath* may go the Round of the *Circle*, and come forth at the ſecond Hole. You may trie likewiſe *Percuſſions* of *Solid Bodies* of ſeverall *Figures*; As *Globes*, *Flats*, *Cubes*, *Croſſes*, *Triangles*, &c. And their *Combinations*; As *Flat* againſt *Flat*: And *Convex* againſt *Convex*: And *Convex* againſt *Flat*, &c. And mark well the diverſities of the *Sounds*. Try alſo the difference in *Sound* of ſeverall *Craſſitudes* of *Hard Bodies* percuffed: And take knowledge of the diverſities of the *Sounds*. I my ſelf have tried, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferior to that of *Silver*, or *Brass*, but rather better: yet we ſee that a piece of *Money* of *Gold* foundeth farre more flat than a piece of *Money* of *Silver*,

222

The *Harp* hath the *Concave*, not along the *Strings*, but acroſs the *Strings*; And no *Instrument* hath the *Sound* ſo Melting, and Prolonged, as the *Iriſh Harp*. So as I ſuppoſe, that if a *Virginall* were made with a double *Concave*; the one all the length as the *Virginall* hath; the other at the End of the *Strings*, as the *Harp* hath; It muſt needs make the *Sound* perfecter, and not ſo Shallow, and Jarring. You may trie it, without any *Sound-Board* along, but only *Harp-wiſe*, at one End of the *Strings*: Or laſtly with a double *Concave*, at Each end of the *Strings* one.

223

There is an apparent Diverſity between the *Species Viſible*, and *Audible*, in this; That the *Viſible* doth not mingle in the *Medium*, but the *Audible* doth. For if we look abroad, we ſee Heaven, a number of Starres, Trees, Hills, Men, Beaſts, at once. And the *Species* of the one doth not confound the other. But if ſo many *Sounds* come from ſeverall Parts, one of them would utterly confound the other. So we ſee, that *Voices* or *Conſorts* of *Muſick* do make an *Harmony* by *Mixture*, which *Colours* do not. It iſt true nevertheleſs, that a great *Light* drowneth a ſmaller, that it cannot be ſeen; As the *Sunne* that of a *Gloworm*; as well as a Great *Sound* drowneth a leſſer. And I ſuppoſe likewiſe, that if there were two *Lanthornes* of *Glaſs*, the one a *Crimſin*, and the other an *Azure*, and a *Candle* within either of them, thoſe Coloured *Lights* would mingle and caſt upon a *White Paper* a *Purple Colour*. And even in *Colours*, they yeeld a faint and weak *Mixture*: For white walls make *Roomes* more lightſome than black, &c. But the *Cauſe* of the *Confuſion* in *Sounds*, and the *Inconfuſion* in *Species Viſible*; is, For that the *Sight* worketh in *Right Lines*, and maketh ſeverall *Cones*; And ſo there can be no *Coincidence* in the *Eie*, or *Viſuall Point*: But *Sounds* that move in *Oblique* and *Arcuate Lines*, muſt needs encounter, and diſturb the one the other.

Experiments in Conſort, touching the Mixture of Sounds.

224

The ſweeteſt and beſt *Harmony* is, when every *Part* or *Instrument*, is not heard by it ſelf, but a *Conſtation* of them all; Which requireth to ſtand ſome diſtance off. Even as it is in the *Mixture* of *Perfumes*; Or the *Taking* of the *Smels* of ſeverall *Flowers* in the *Air*.

225

The *Diſpoſition* of the *Air*, in other *Qualities*, except it be joynd with *Sound*, hath no great *Operation* upon *Sounds*: For whether the *Air* be

226

lightsome or dark, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

see

227

But *Sounds* do disturb and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one jarring and discording with the other, and making a Confusion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

228

Two *Voices* of like *lowdness*, will not be heard twice as farre, as one of them alone; And two *Candles* of like light, will not make things seem twice as farre off, as one. The Cause is profound; But it seemeth that the *Impressions* from the *Objects* of the *Senses*, do mingle respectively, every one with his kind; But not in proportion, as is before demonstrated: And the reason may be, because the first *Impression*, which is from *Privative* to *Active* (As from *Silence* to *Noise*, or from *Darkness* to *Light*;) is a greater Degree, than from *Less Noise*, to *More Noise*, or from *Less Light* to *More Light*. And the Reason of that again may be; For that the *Air*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of *Vertue* generally, what Proportion it beareth to the Encrease of the *Matter*, it is a large Field, and to be handled by it self.

Experiments
in Confort
touching Me-
lioration of
Sounds.

229

ALL *Reflexions* Concurrent, do make *Sounds* Greater; But if the *Body* that createth, either the *Originall Sound*, or the *Reflexion*, be clean and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the *Belly* of polished *Brass* in stead of *Wood*. We see that even in the *Open Air*, the *Wire String* is sweeter, than the *String* of *Guts*. And we see that for *Reflexion*, *Water* excelleth, As in *Musick* near the *Water*; Or in *Eccho's*.

230

It hath been tried, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne *Sound*, than if the *Pipe* were dry: But yet with a sweet Degree of *Sibilation*, or *Purling*; As we touched it before in the title of *Equality*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) between dry and wet, become a little more Even and Smooth; But the *Purling* (which must needs proceed of *Inequality*;) I take to be bred between the Smoothness of the inward Surface of the *Pipe*, which is wet; And the Rest of the *Wood* of the *Pipe*, unto which the *Wet* cometh not, but it remaineth dry.

231

In *Frosty Weather*, *Musick* within doors soundeth better. Which may be, by reason, not of the Disposition of the *Air*, but of the *Wood* or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow: And we see that *Old Lutes* sound better than *New*, for the same reason. And so do *Lute-strings* that have been kept long.

232

Sound is likewise *Meliorated* by the *Mingling* of *Open Air* with *Pent Air*; Therefore Triall may be made, of a *Lute* or *Violl* with a double *Belly*; Making another *Belly* with a *Knot* over the *Strings*; yet so, as there be Room enough for the *Strings*, and Room enough to play below that *Belly*. Triall may be also of an *Irish Harp*, with a *Concave* on both *Sides*; whereas it useth to have it but on one *Side*. The doubt may be, lest it should make too much *Resounding*; whereby one *Note* would overtake another.

233

If you sing in the *Hole* of a *Drum*, it maketh the *Singing* more sweet. And so I conceive it would, if it were a *Song* in *Parts*, sung into severall *Drums*; And for handfomness and strangeness sake, it would not be amiss to have a *Curtain* between the *Place*, where the *Drums* are, and the *Hearers*.

see

Original

When

When a *Sound* is created in a *Wind-Instrument*, between the *Breath* and the *Air*, yet if the *Sound* be communicate with a more equall *Body* of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a *Trumpet*, or *Pipe of Wood*; And again in a *Trumpet* or *Pipe of Brass*. It were good to try *Recorders* and *Hunters Horns of Brass*, what the *Sound* would be.

234

Sounds are *meliorated* by the *Intension of the Sense*, where the *Common Sense* is collected moit, to the *particular Sense* of *Hearing*, and the *Sight* suspended: and therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to *blind Men*, than to *Others*: And it is manifest, that between *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musick* is farre sweeter, than when one is *fully waking*.

235

IT is a Thing strange in Nature, when it is attentively considered; How *Children*, and some *Birds*, learn to *imitate Speech*. They take no Mark (at all) of the *Motion* of the *Mouth* of Him that *speaketh*; For *Birds*, are as well taught in the *Dark*, as by *Light*. The *Sounds* of *Speech* are very *Curious* and *Exquisite*: So one would think it were a *Lesson* hard to learn. It is true, that it is done with *time*, and by *little and litle*, and with many *Essays* and *Proffers*: But all this dischargeth not the *Wonder*. It would make a *Man* think (though this which we shall say may seem exceeding strange) that there is some *Transmission* of *Spirits*; and that the *Spirits* of the *Teacher* put in *Motion*, should work with the *Spirits* of the *Learner*, a *Pre-disposition* to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest secrets in Nature,) we shall speak in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certain, that there is in *Men*, and other *Creatures*, a *pre-disposition* to *Imitate*. We see how ready *Apes* and *Monkies* are, to *imitate* all motions of *Man*: And in the *Catching* of *Dot-trells*, we see, how the *Foolish Bird* playeth the *Ape* in *Gestures*: And no *Man* (in effect) doth accompany with others, but he learneth (ere he is aware,) some *Gesture*, or *Voice*, or *Fashion* of the other.

Experiments
in Confort
touching the
Imitation of
Sounds.

236

In *Imitation of Sounds*, that *Man* should be the *Teacher*, is no Part of the Matter; For *Birds* will learn one of another; And there is no *Reward*, by feeding, or the like, given them for the *Imitation*; And besides, you shall have *Parrets*, that will not only *imitate* *Voices*, but *Laughing*, *Knocking*, *Squeaking* of a *Doore* upon the *Hinges*, or of a *Cart-wheele*; And (in effect) any other *Noise* they hear.

237

No *Beast* can *imitate* the *Speech* of *Man*, but *Birds* only; For the *Ape* it self, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of *Speech*. It is true, that I have known a *Dog*, that if one howled in his *Ear*, he would fall a howling a great while. What should be the *Aptness* of *Birds*, in comparison of *Beasts*, to *imitate* the *Speech* of *Man*, may be further enquired. We see that *Beasts* have those *Parts*, which they count the *Instruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker unto *Man*, than *Birds*. As for the *Neck*, by which the *Throat* passeth; we see many *Beasts* have it, for the *Length*, as much as *Birds*. What better *Gorge*, or *Attire*, *Birds* have, may be further enquired. The *Birds* that are known to be *Speakers*, are, *Parrets*, *Pyes*, *Fayes*, *Dawes*, and *Ravens*. Of which *Parrets* have an *adunque Bill*, but the rest not.

238

But I conceive, that the *Aptness* of *Birds*, is not so much in the *Conformity* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* must come by

239

Hearing

Hearing, and Learning; And *Birds* give more heed, and mark *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, do keep them Waking, to encrease their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are ever the better *Singers*; which may be, because they are more lively, and listen more.

240 *Labour*, and *Intention* to imitate *Voices*, doth conduce much to *Imitation*: And therefore we see, that there be certain *Pantomimi*, that will represent the voices of *Players* of *interludes*, so to life, as if you see them not, you would think they were those *Players* themselves; And so the *Voices* of other *Men* that they hear.

241 There have been some, that could counterfeit the *Distance* of *Voices*, (which is a *Secondary Object* of *Hearing*) in such sort; As when they stand fast by you, you would think the *speech* came from a farre off, in a fearfull manner. How this is done, may be further enquired. But I see no great use of it, but for *Imposture*, in counterfeiting *Ghosts* or *Spirits*.

Experiments
in Consort
touching the
Reflexion of
Sounds.

There be three Kinde of *Reflexions* of *Sounds*; A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the first hath been handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speak of.

242 The *Reflexion* of *Species Visible*, by *Mirrors*, you may command; Because passing in *Right Lines*, they may be guided to any point: But the *Reflexion* of *Sounds* is hard to matter; Because the *Sound* filling great *Spaces* in *Arched Lines*, cannot be so guided: And therefore we see there hath not been practised, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already known returneth in a very narrow *Room*.

243 The *Naturall Eccho's* are, made upon *Walls*, *Woods*, *Rocks*, *Hills*, and *Banks*; As for *Waters*, being near, they make a *Concurrent Eccho*; but being further off, (as upon a large *River*) they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the *Quickness*, or *Slowness* of the *Return*. But there is no doubt, but *Water* doth help the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certain, (as hath been formerly touch'd,) that if you speak thorow a *Trunk*, stopped at the further end; you shall find a *Blast* return upon your *Mouth*, but no *Sound* at all. The *Cause* is, for that the *Clofeness*, which preserveth the *Originall*, is not able to preserve the *Reflected Sound*: Besides that *Eccho's* are seldome created, but by loud *Sounds*. And therefore there is less hope of *Artificiall Eccho's* in *Air*, pent in a narrow *Concave*. Nevertheless it hath been tried, that one leaning over a *Well*, of 25 *Fathome* deep, and speaking, though but softly, (yet not to soft as a *whisper*), the *Water* returned a good *Audible Eccho*. It would be tried, whether *Speaking* in *Caves*, where there is no *Issue*, save where you speak, will not yeeld *Eccho's*, as *Wells* do.

245 The *Eccho* cometh as the *Originall Sound* doth, in a round *Orbe* of *Air*: It were good to trie the *Creating* of the *Eccho*, where the *Body* *Repercussing* maketh an *Angle*: As against the *Return* of a *Wall*, &c. Also we see that in *Mirrors*, there is the like *Angle* of *Incidence*, from the *Object* to the *Glass*, and from the *Glass* to the *Eie*. And if you strike a *Ball* side-long, not full upon the *Surface*, the *Rebound* will be as much the contrary way; Whether

ther there be any such *Resilience* in *Eccho's*, (that is, whether a Man shall hear better, if he stand aside the Body Repercussing, than if he stand where he speaketh, or any where in a right Line between,) may be tried, Triall likewise would be made, by Standing nearer the place of Repercussing, than he that speaketh; And again by Standing further off, than he that speaketh; And so knowledge would, be taken, whether *Eccho's*, as well as *Original Sounds*, be not strongest near hand.

There be many Places, where you shall hear a number of *Eccho's* one after another: And it is, when there is Variety of *Hills* or *Woods*, some nearer some further off: So that the Returne from the further, being last created, will be likewise last heard.

As the *Voice* goeth round, as well towards the Back, as towards the Front of him that speaketh: So likewise doth the *Eccho*; For you have many Back-*Eccho's* to the Place where you stand.

To make an *Eccho*, that will report, three or four, or five Words, distinctly, it is requisite, that the *Body Repercussing*, be a good distance off: For if it be near, and yet not so near, as to make a *Concurrent Eccho*, it choppeth with you upon the sudden. It is requisite likewise, that the *Air* be not much *pent*. For *Air*, at a great distance, *pent*, worketh the same effect with *Air*, at *large*, in a small distance. And therefore in the *Triall* of *Speaking* in the *Well*, though the *Well* was deep, the *Voice* came back, suddenly; And would bear the Report but of two Words.

For *Eccho's* upon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or four Miles from *Paris*, near a Town called *Pont-Charenton*; And some Bird-bolt shot, or more, from the River of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Isles of *Churches*, also standing; The Roof all open, not so much as any Emboument near any of the walls left. There was against every Pillar, a Stack of Billets, above a Mans Height; which the Watermen, that bring Wood down the *Seane*, in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did hear it return the *Voice* thirteen severall times; And I have heard of others, that it would return sixteen times: For I was there about three of the Clock in the afternoon: And it is best, (as all other *Eccho's* are) in the Evening. It is manifest, that it is not *Eccho's* from severall places, but a *Tossing* of the *Voice*, as a Ball to and fro; Like to *Reflexions* in *Looking glasses*; where if you place one *Glass* before, and another behind, you shall see the *Glass* behind with the *Image*, within the *Glass* before; And again, the *Glass* before in that; and divers such *Super-Reflexions*, till the *species speciei* at last die. For it is every Return weaker, and more shady. In like manner, the *Voice* in that *Chappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you speak three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for some times; Still fading, and growing weaker. And whereas in *Eccho's* of one Return, it is much to hear four or five Words; In this *Eccho* of so many Returnes, upon the matter, you hear above twenty Words for three.

The like *Eccho* upon *Eccho*, but only with two Reports, hath been observed, to be, if you stand between a *House*, and a *Hill*, and lure towards the

Hill. For the *House* will give a *Back Eccho*; One taking it from the other, and the latter the weaker.

251 There are certain *Letters*, that an *Eccho* will hardly express; As *S*, for one, Especially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pent-Charenton*, there was an Old *Parisian*, that took it to be the Work of *Spirits*, and of good *Spirits*. For, (said he) call *Satan*, and the *Eccho* will not deliver back the *Devils* name; But will say, *Va'en*; Which is as much in *French*, as *Apage*, or *Avoid*. And thereby I did hap to find, that an *Eccho* would not return *S*, being but a *Hissing* and an *Interior Sound*.

252 *Eccho's* are some more sudden, and chop again, as soone as the *Voice* is delivered; As hath been partly said: Others are more deliberate, that is give more Space between the *Voice*, and the *Eccho*; which is caused by the locall *Nearness*, or *Distance*: Some will report a longer *Train of Words*; And some a shorter: Some more loud (full as loud as the *Originall*, and sometimes more loud;) And some weaker and fainter.

253 Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a *Quire of Eccho's*, and so make the Report greater, and even a *Continued Eccho*; which you shall find in some *Hills*, that stand encompassed, Theatre-like.

254 It doth not yet appear, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I do not think, that if a *Sound* should pass through divers *Mediums*, (as *Air*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that unto which it is deferred; which is the Proper Effect of *Refraction*. But *Majoration* which is also the Work of *Refraction*, appeareth plainly in *Sounds*, (as hath been handled at full;) But it is not by Diversity of *Mediums*.

Experiments
in Consent
touching the
Consent and
Dissent be-
tween
Visibles
and *Audibles*.

We have obiter, for *Demonstrations* sake, used in divers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature of Sounds*. But we think good now to prosecute that *Comparison* more fully.



CONSENT OF VISIBLES and Audibles.

255 **B**oth of them spread themselves in *Round*, and fill a whole *Floare* or *Orbe*, unto certain *Limits*: And are carried a great way. And do languish and lessen by degrees, according to the *Distance* of the objects from the *Sensories*.

256 Both of them have the whole *Species* in every small portion of the *Air* or *Medium*, So as the *Species* do pass through small *Cranies*, without *Confusion*: As we see ordinarily in *Levels*, as to the *Eie*; And in *Cranies*, or *Chinks*, as to the *Sound*.

257 Both of them are of a sudden and easie *Generation* and *Delation*; And likewise perish swiftly, and suddenly; As if you remove the *Light*; Or touch the *Bodies* that give the *Sound*.

Both of them do receive and carry exquisite and accurate Differences; As of Colours, Figures, Motions, Distances, in Visibles; And of Articulate Voices, Tones, Songs, and Quaverings, in Audibles.

258

Both of them in their Vertue and Working, do not appear to emit any Corporall Substance into their Mediums, or the Orbe of their Vertue; Neither again to rise or stir any evident locall Motion in their Mediums, as they pass; But only to carry certain Spirituall Species. The perfect knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

259

Both of them seem not to generate or produce any other Effect in Nature, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren.

260

But Both of them in their own proper Action, do work three manifest Effects. The First, in that the Stronger pieces downeth the Lesser; As the Light of the Sun, the light of a Glowworm; The Report of an Ordnance, the Voice; The Second, in that an Object of Surcharge or Excess destroyeth the Sense; As the Light of the Sun the Eie, a violent Sound (near the Ear) the Hearing; The Third, in that both of them will be reverberate, As in Mirrours; And in Echo's.

261

Neither of them doth destroy or hinder the Species of the other, although they encounter in the same Medium; As Light or Colour hinder not Sound; Nor e contra.

262

Both of them affect the Sense in Living Creatures, and yeeld Objects of Pleasure and Dislike: Yet nevertheless, the Objects of them do also, (if it be well observed) affect and work upon dead Things; Namely such, as have some Conformity with the Organs of the two senses; As Visibles work upon a Looking-glass, which is like the Pupill of the Eie; And Audibles upon the Places of Echo, which resemble, in some sort, the Caverne and structure of the Ear.

263

Both of them do diversly work, as they have their Medium diversly disposed. So a Trembling Medium (as Smoak) maketh the Object seem to tremble; and a Rising or Falling Medium (as Winds) maketh the Sounds to rise, or fall.

264

To Both, the Medium, which is the most Propitious and Conducibile, is Air, For Glasse, or Water, &c. are not comparable.

265

In Both of them, where the object is Fine and Accurate, it conduceth much to have the Sense Inventive, and Erect; Inasmuch as you contract your Eie, when you would see sharply; And erect your Ear, when you would hear attentively; which in Beasts that have Eares moveable, is most manifest.

266

The Beames of Light, when they are multiplied, and conglomerate, generate Heat; which is a different Action, from the Action of Sight: And the Multiplication and Conglomeration of Sounds, doth generate an extreme Rarefaction of the Air; which is an Action materiate, differing from the Action of Sound; If it be true (which is anciently reported) that Birds, with great shouts, have fallen down.

267

DISSENT OF VISIBLES
and Audibles.

- 268 **T**He *Species* of *Visibles* seem to be *Emissions* of *Beames* from the *Object* seen; Almost like *Odours*, save that they are more *Incorporeall*: But the *Species* of *Audibles* seem to Participate more with *Locall Motion*, like *Percussions*, or *Impressions* made upon the *Air*. So that whereas all *Bodies* do seem to work in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.
- 269 The *Species* of *Audibles* seem to be carried more manifestly thorow the *Air*, than the *Species* of *Visibles*: For (I conceive) that a *Contrary strong Wind* will not much hinder the *Sight* of *Visibles*, as it will do the *Hearing* of *Sounds*.
- 270 There is one *Difference*, above all others, between *Visibles* and *Audibles*, that is the most remarkable; as that whereupon many smaller *Differences* do depend: Namely, that *Visibles*, (except *Lights*), are carried in *Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it cometh to pass, that *Visibles* do not intermingle, and confound one another, as hath been said before; But *Sounds* do. Hence it cometh, that the *Solidity* of *Bodies* doth not much hinder the *Sight*, so that the *Bodies* be clear, and the *Pores* in a *Right Line*, as in *Glass*, *Chrystall*, *Diamonds*, *Water*, &c. But a thin *Scarfe*, or *Handkerchiefe*, though they be *Bodies* nothing so solid, hinder the *Sight*: Whereas (contrariwise) these *Porous Bodies* do not much hinder the *Hearing*, but solid *Bodies* do almost stop it, or at the least attenuate it. Hence also it cometh, that to the *Reflexion* of *Visibles*, small *Glasses* suffice, but to the *Reverberation* of *Audibles*, are required greater *Spaces*, as hath likewise been said before.
- 271 *Visibles* are seen further off, than *Sounds* are heard; Allowing nevertheless the *Rate* of their *Bigness*: For otherwise a *great Sound* will be heard further off, than a *small Body* seen.
- 272 *Visibles* require (generally) some *Distance* between the *Object*, and the *Eie*, to be better seen; Whereas in *Audibles*, the nearer the *Approach* of the *Sonnd* is to the *Sense*, the better. But in this there may be a double *Errour*. The one because to *Seeing*, there is required *Light*; And any thing that toucheth the *Pupill* of the *Eie* (all over,) excludeth the *Light*. For I have heard of a *Person* very credible, (who himself was cured of a *Cataract* in one of his *Eies*,) that while the *Silver Needle* did work upon the *Sight* of his *Eie*, to remove the *Filme* of the *Cataract*, he never saw any thing more cleare or perfect, than that white *Needle*: Which (no doubt,) was, because the *Needle* was lesser than the *Pupill* of the *Eie*, and so took not the *Light* from it. The other *Errour* may be, for that the *Object* of *Sight* doth strike upon the *pupill* of the *Eie*, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the *Sound* a little from the *Organ*: And so nevertheless there is some *Distance* required in both.
- Visibles* are swiftilier carried to the *Sense*, than *Audibles*: As appeareth in *Thunder*

Thunder and Lightning; Flame and Report of a Piece; Motion of the Air in Hewing of Wood. All which have been set down heretofore but are proper for this Title.

I conceive also, that the *Species* of *Audibles*, do hang longer in the Air than those of *Visibles*: For although even those of *Visibles*, do hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fil- lipped; A *Fire-brand* carried along, which leaveth a Train of Light behind it; and in the *Twilight*; And the like: Yet I conceive that *Sounds*, stay longer, because they are carried up and down with the Wind: And because of the Distance of the Time, in *Ordinance discharged*, and heard twenty Miles off.

In *Visibles*, there are not found Objects so odious and ingrate to the *Sense*, as in *Audibles*. For foul *Sights* do rather displease, in that they excite the Memory of foul Things, than in the immediate Objects. And therefore in *Pictures*, those foul *Sights* do not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge; And any of the *harsh Discords* in *Musick*, the Ear doth straightwaies refuse.

In *Visibles*, after great Light, if you come suddenly into the *Dark*; Or contrariwise, out of the *Dark* into a *Glaring light*, The Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after a *deeper Silence*, may be better enquired. It is an old Tradition, that those that dwell near the *Cataracts* of *Nilus*, are stricken deaf: But we find no such effect, in Cannoniers, nor Millers, nor those that dwell upon Bridges.

It seemeth that the *Impression* of *Colour* is so weak, as it worketh not but by a Cone of *Direct Beames*, or *Right Lines*; whereof the Basis is in the Object, and the *Vertical Point* in the Eye; So as there is a *Corradiation* and *Conjunction* of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speak not. For the *Beames* pass, and give little *Tincture* to that Air, which is *Adjacent*; which if they did, we should see *Colours* out of a *Right line*. But as this in *Colours*, so otherwise it is in the *Body of Light*. For when there is a *Skreen* between the *Candle* and the *Eye*, yet the *Light* passeth to the *Paper* whereon one writeth; So that the *Light* is seen where the *Body of the Flame* is not seen; And where any *Colour* (if it were placed where the *Body of the Flame* is) would not be seen. I judge that *Sound* is of this *Latter Nature*: For when two are placed on both sides of a *Wall*, and the *Voice* is heard, I judge it is not only the *Original Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth above the *Wall* in a *Right Line*, begetteth the like *Motion* round about it, as the first did, though more weak.

ALL *Concords* and *Discords* of *Musick*, (no doubt) *Sympathies* and *Antipathies* of *Sounds*. And so (likewise) in that *Musick*, which we call *Broken Musick*, or *Consort Musick*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet observed:) As the *Irish Harp*, and *Base Violl* agree well: The *Recorder* and *Stringed Musick* agree well: *Organs* and the *Voice* agree well, &c. But the *Virginalls* and the *Lute*; Or the *Welch-Harp*; and *Irish-Harp*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musick* there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire.

Experiments
in Consort
touching the
Sympathy or
Antipathy of
Sounds, one
with another

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279 There is a Common Observation, that if a *Lute*; or *Viall*, be layed upon the Back, with a small Straw upon one side of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute*, or *Viall*, the *Unison* to that *String* be strucken; it will make the *String* move; Which will appeare both to the *Eie*, and by the *Straws* falling off. The like will be, if the *Diapason* or *Eight* to that *String* be strucken, either in the same *Lute*, or *Viall*, or in others lying by; But in none of these there is any Report of *Sound*, that can be discerned, but only Motion.

280 It was devised, that a *Viall* should have a Lay of Wire Strings-below, as close to the Belly as a *Lute*; And then the *Strings* of Guts mounted upon a Bridge, as in Ordinary *Vialls*; To the end, that by this meanes, the upper *Strings* strucken, should make the lower resound by *Sympathy*, and so make the *Musick* the better; Which, if it be to purpose, then *Sympathy* worketh as well by Report of *Sound*, as by *Motion*. But this device I conceive to be of no ute, because the upper *Strings*, which are stopped in great variety, cannot maintain a *Diapason* or *Unison*, with the Lower, which are never stopped. But if it should be of ute at all; it must be in *Instruments* which have no Stops; as *Virginalls*, and *Harp*s; wherein triall may be made of two Rows of *Strings*, distant the one from the other.

281 The *Experiment* of *Sympathy* may be transferred (perhaps) from *Instruments* of *Strings* to other *Instruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Unison*, whether the striking of the one would move the other, more then if it were another Accord: And so in *Pipes*, (if they be of equall Bore, and *Sound*;) whether a little Straw or Feather would move in the one *Pipe*, when the other is blown at an *Unison*.

282 It seemeth both in *Ear*, and *Eie*, the *Instrument* of *Sense* hath a *Sympathy* or Similitude with that which giveth the *Reflexion*; (As hath been touch'd before.) For as the *Sight* of the *Eye* is like a Chrystall, or Glasse, or Water; So is the *Ear* a sinuous Cave, with a hard Bone, to stop and reverberate the *Sound*: Which is like to the Places that report *Eccho's*.

When a Man *Tawneth*, he cannot *Hear* so well. The *Cause* is for that the *Membrane* of the *Ear* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Hear* better when we hold our *Breath*, than contrary; Inasmuch as in all Listening to attain a *Sound* a farre off, Men hold their *Breath*. The *Cause* is, For that in all *Expiration*, the Motion is Outwards; and therefore, rather driveth away the voice, than draweth it: And besides we see, that in all *Labour* to do things with any strength, we hold the *Breath*: And listening after any *Sound*, that is heard with difficulty, is a kind of *Labour*.

285 Let it be tried, for the *Help* of the *Hearing*, (and I conceive it likely to succeed,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the Bigness of the Hole of the *Ear*; And the Broader End much larger, like a *Bell* at the Skirts; And the length half a foot, or more. And let the narrow End of it be set close to the *Ear*: And mark whether any *Sound* abroad in the open Air, will not be heard distinctly, from further distance, than without that *Instrument*; being (as it were) an *Ear-Spectacle*. And I have heard there is in *Spain*, an *Instrument* in use to be set to the *Ear*, that helpeth somewhat those that are Thick of *Hearing*.

286 If the *Mouth* be shut Close, nevertheless there is yielded by the Roof of the mouth, a Murmur. Such as is used by dumb Men: But if the *Nostrills* be likewise stopped, no such Murmur can be made; Except it be in the Bot-
tome

Experiments
in Consort
touching the
Hindring or
Helping of the
Hearing.

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to me of the Pallate towards the Throat. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as aforesaid, if the *Mouth* be stopped, passeth from the *Pallate* through the *Nostrills*.

The *Repercussion* of *Sounds*, (which we call *Eccho*;) is a great Argument of the *Spiritual Essence* of *Sounds*. For if it were *Corporeall*, the *Repercussing* should be created in the same manner, and by like *Instruments*, with the *Originall Sound*: But we see what a Number of *Exquisite Instruments* must concur in Speaking of Words, whereof there is no such Matter in the *Returning* of them; But only a plain Stop, and *Repercussion*.

The *Exquisite Differences* of *Articulate Sounds*, carried along in the *Air*, shew that they cannot be *Signatures* or *Impressions* in the *Air*, as hath been well refuted by the *Ancients*. For it is true, that *Seals* make excellent *Impressions*: And so it may be thought of *Sounds* in their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot be *Impressions*.

All *Sounds* are suddenly made, and do suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great *Admiration*: For the *Quaverings*, and *Warblings* in *Lutes*, and *Pipes*, are as swift; And the *Tongue*, (which is no very fine Instrument,) doth in *Speech*, make no fewer *Motions*, than there be *Letters* in all the *Words*, which are uttered. But that *Sounds* should not only be so speedily generated, but carryed so farre every way in such a momentary time, deserves more *Admiration*. As for Example; If a Man stand in the *Middle* of a *Field*, and speak aloud, he shall be heard a *Furlong* in round; And that shall be in *Articulate Sounds*; And those shall be *Entire* in every little *Portion* of the *Air*; And this shall be done in the *Space* of less than a *Minute*.

The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two *Ways*. Either that the *Air* suffereth some *Force* by *Sound*, and then restoreth it self; As *Water* doth; Which being divided, maketh many *Circles*, till it restore it self to the *naturall Consistence*: Or otherwise, that the *Air* doth willingly imbibe the *Sound* as gratefull, but cannot maintain it; for that the *Air* hath (as it should seeme) a secret and hidden *Appetite* of *Receiving* the *Sound* at the first; But then other *Gross* and more *Materiate Qualities* of the *Air* straightwaies suffocate it; Like unto *Flame*, which is generated with *Alacrity*, but straight quenched by the *Enmity* of the *Air*, or other *Ambient Bodies*.

There be these *Differences* (in generall) by which *Sounds* are divided, 1. *Musicall*, *mmusicall*; 2. *Treble*, *Base*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Clean*, *Harsh* or *Purling*; 7. *Articulate*, *Inarticulate*.

We have laboured (as may appear) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most *Hidden Portions* of *Nature*, (as we said in the beginning:) And because it is a *Vertue* which may be called *Incorporeal*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*;) to make a *Paterne* or *President* of an

Experiments
in Consort,
touching the
Spiritual and
Fine Nature
of Sounds.

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Exact Inquisition; And we shall do the like hereafter in some other Subjects which require it. For we desire that Men should learn and perceive, how severe a Thing the true *Inquisition of Nature* is; And should accustom themselves, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the World; and not reduce the World to the Narrowness of their Mindes.

Experiment
Solitary
touching the
Orient Colours,
in Dissolution
of Metals.

291

Metals give *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giveth an excellent *Yellow*; *Quick-silver* an excellent *Green*; *Tinne* giveth an excellent *Azure*: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion* *Verdegrease*, *Bise*, *Cirrus*, &c. And likewise in their *Vitrifications*. The *Cause* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And again to retain Part of their principall Spirit; Which two Things, (Equall Posture, and Quick Spirits) are required chiefly, to make *Colours* lightsome.

Experiment
Solitary touch-
ing Prolon-
gation of Life.

292

IT conduceth unto *Long Life*, and to the more Placide Motion of the Spirits, which thereby do less prey and consume the Juice of the Body; Either that *Mens Actions* be free and *Voluntary*; that nothing be done *Involuntarily*, but *Secundum genium*: Or on the other side, that the *Actions of Men* be full of *Regulation*, and *Commands within themselves*: For then the Victory and Performing of the Command, giveth a good Disposition to the Spirits; Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life: And of the latter, in *Monkes* and *Philosophers*; and such as do continually enjoyne themselves.

Experiment
Solitary touch-
ing Appetite
of Union in
Bodies.

293

IT is certain, that in all Bodies, there is an *Appetite of Union*, and Evitation of Solution of Continuity: And of this *Appetite* there be many *Degrees*; But the most Remarkable, and fit to be distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*; this *Appetite* is weak. We see in *Liquours*, the *Thredding* of them in *Stillicides*, (as hath been said.) The *Falling* of them in *Round Drops*, (which is the form of *Union*;) And the *Staying* of them for a little time, in *Bubbles* and *Froth*. In the second *Degree* or *Kind*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*; &c. In the third, this *Appetite* is in a *Medium* between the other two: For such *Bodies* do partly follow the Touch of another Body; And partly stick and continue to themselves; And therefore they roap, and draw themselves in Threds; as we see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solid Bodies* are *Cleaving*, more or less: and that they love better the Touch of somewhat that is *Tangible*, than of *Air*: For *Water*, in small quantity, cleaveth to any Thing that is *Solid*; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaveth: But those *Bodies* which are noted to be *Clammy*, and *Cleaving*, are such, as have a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a *Forrain Body*, than in preserving their own *Consistence*; And which have little predominance in *Drought* or *Moisture*.

Time

Time, and Heat, are Fellows in many Effects. Heat drieth Bodies, that do easily expire; As Parchment, Leaves, Roots, Clay, &c. And, so doth Time or Age arefie; As in the same Bodies, &c. Heat dissolveth and melteth Bodies, that keep in their Spirits; As in divers Liquefactions; And so doth Time, in some Bodies of a softer Consistence: As is manifest in Honey, which by Age waxeth more liquid; And the like in Sugar; And so in old Oyl, which is ever more clear and more hot in Medicinable use. Heat causeth the Spirits to search some Issue out of the Body, as in the Volatility of Metals; And so doth Time; As in the Rust of Metals. But generally Heat doth that in small time, which Age doth in long.

Experiment Solitary, touching the like Operations of Heat, and Time.

294

Some Things which pass the Fire are softest at first, and by Time grow Shard; As the Crumme of Bread. Some are harder when they come from the Fire, and afterwards give again, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The Cause is, for that in those things which wax Hard with Time, the Work of the Fire is a Kind of Melting: And in those that wax soft with Time, (contrariwise,) the work of the Fire is a Kind of Baking; And whatsoever the Fire baketh, Time doth in some degree dissolve.

Experiment Solitary, touching the differing Operations of Fire, and Time.

295

Motions pass from one Man to another, not so much by Exciting Imagination, as by Invitation; Especially if there be an Aptness or Inclination before. Therefore Gaping, or Yawning; and Stretching do pass from Man to Man; For that that causeth Gaping or Stretching is, when the Spirits are a little Heavy, by any Vapour, or the like. For then they strive (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleep; Or before the Fit of an Ague; do use to Yawn and Stretch; And do likewise yeeld a Voice or Sound, which is an Interjection of Expulsion: So that if another be apt and prepared to do the like, he followeth by the Sight of another. So the Laughing of another maketh to Laugh.

Experiment Solitary, touching Motions by Imitation.

296

There be some known Diseases that are Infectious; And others that are not. Those that are Infectious, are; First, such as are chiefly in the Spirits, and not so much in the Humours; And therefore pass easily from Body to Body: Such are Pestilences, Lippitudes: and such like. Secondly, such as Taint the Breath; Which we see passeth manifestly from Man to Man; And not invisible, as the Affects of the Spirits do: Such are Consumptions of the Lungs, &c. Thirdly, such as come forth to the Skin; And therefore taint the Air, or the Body Adjacent; Especially if they consist in an Unctuous Substance, not apt to dissipate; Such are Scabs, and Leprosie. Fourthly, such as are meerly in the Humours, and not in the Spirits, Breath, or Exhalations: And therefore they never infect, but by Touch only; And such a Touch also, as cometh within the Epidermis; As the venome of the French Pox; And the Biting of a Mad Dog.

Experiment Solitary, touching Infectious Diseases.

297

Most Powders grow more Close and Coherent by Mixture of Water than by Mixture of Oyl, though Oyl be the thicker Body; as Meal, &c. The Reason is the Congruity of Bodies; which if it be more, maketh a Perfecter Imbibition, and Incorporation; Which in most Powders is more between Them and Water, then between Them and Oyl: But Painters Colours ground, and Ashes, do better incorporate with Oyl.

Experiment Solitary, touching the Incorporation of Powders, and Liquours.

298

Experiments
Solitary, tou-
ching Ex-
ercise of the
Body.

299

Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for others. If the *Body* be *Hot*, and *Void* of *Superfluous* *Moistures*, too much *Motion* hurteth: And it is an *Errour* in *Physitians*, to call too much upon *Exercise*. Likewise men ought to beware, that they use not *Exercise* and a *Spare Diet* both: but if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the *Parts* more forcibly. Secondly, that it helpeth to *Excerne* by *Sweat*, and so maketh the *Parts* assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solid* and *Compact*; And so less apt to be *Consumed* and *Depredated* by the *Spirits*. The *Evils* that come of *Exercise*, are: First, that it maketh the *Spirits* more *Hot* and *Predatory*. Secondly, that it doth abforbe likewise, and attenuate too much the *Moisture* of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in *Rest*. But generally *Exercise*, if it be much, is no *Friend* to *Prolongation* of *Life*; Which is one *Cause*, why *Women* live longer then *Men*, because they stirre less.

Experiments
Solitary, tou-
ching Meats
that induce
Satiety.

300

Some *Food* we may use *long*, and *much*, without *Glutting*; As *Bread*, *Flesh* that is not *fat*, or *rank*, &c. Some other (though pleasant,) *Glutteth* sooner, As *Sweet Meats*, *Fat Meats*, &c. The *Cause* is, for that *Appetite* consisteth in the *Emptiness* of the *Mouth* of the *Stomack*; Or possessing it with somewhat that is *Astringent*; And therefore *Cold* and *Dry*. But things that are *Sweet* and *Fat*, are more *Filling*: And do swimme and hang more about the *Mouth* of the *Stomach*; And go not down so speedily: And again turn sooner to *Choler*, which is *hot*, and ever abateth the *Appetite*. We see also, that another *Cause* of *Satiety*, is an *Over-Custome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To give the reason of the *Disaste* of *Satiety*, and of the *Pleasure* in *Novelty*; and to distinguish not only in *Meats* and *Drinks*, but also in *Motions*, *Loves*, *Company*, *Delights*, *Studies*, what they be that *Custome* maketh more gratefull; And what more tedious; were a large *Field*. But for *Meats*, the *Cause* is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a *Relish* by former use. And (generally) it is a *Rule*, that whatsoever is somewhat *Ingrate* at first, is made *Gratefull* by *Custome*, But whatsoever is too *Pleasing* at first, groweth quickly to *satiety*.



NATURALL HISTORY.

IV. Century.

ACCCELERATION of *Time*, in Works of Nature, may well be esteemed *inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating of the Time*, is next to the *Creating of the Master*. We will now therefore proceed to the Enquiry of it: And for *Acceleration of Germination*, we will referre it over unto the place, where we shall handle the Subject of *Plants*, generally; And will now begin with other *Accelerations*.

Liquours are (many of them,) at the first, thick and troubled; As *Must*, *Wort*, *Juyce of Fruits*, or *Herbs* expressed, &c. And by *Time*, they settle, and Clarifie. But to make them clear, before the *Time*, is a great work; For it is a Spur to Nature, and putteth her out of her pace: And besides, it is of good use, for making *Drinks*, and *Sauces*, Potable, and Serviceable, speedily; But to know the *Meanes of Accelerating Clarification*, we must first know the *Causes of Clarification*. The first Cause is, by the *Separation of the Groffer Parts of the Liquour*, from the *Finer*. The second, by the *Equall Distribution of the Spirit of the Liquour*, with the *Tangible Parts*: For that ever representeth Bodies Clear and Untroubled. The third, by the *Refining the Spirit it self*, which thereby giveth to the *Liquour* more Splendour, and more Lustre.

First, for *Separation*: It is wrought by *Weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the severall Parts, either up, or down, which is a kind of *Attraction*.) By *Adhesion*; As when a Body, more *Viscous* is mingled and agitated with the *Liquour*, which *Viscous Body* (afterwards severed) draweth with it the groffer Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

Experiments in Confort touching the Clarification of Liquours, and the Accelerating thereof.

301

302

Secondly,

303 Secondly, for the *Even Distribution* of the *Spirits* ; It is wrought By *Gentle Heat* ; And By *Agitation* or *Motion* ; (For of *Time* we speak not, because it is that, we would anticipate and represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better pass thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise by *Heat* ; By *Motion* ; And By *Mixture* of some *Body* which hath *Vertue* to *attenuate*. So therefore (having shewed the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it, take thete *Instances*, and *Trials*.

305 It is in common Practice, to draw *Wine*, or *Beer*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the sooner : For the *Lees*, though they keep the *Drink* in Heart, and make it lasting ; yet withall they cast up some Spissitude : And this *Instance* is to be referred to *Separation*.

306 On the other side, it were good to try, what the Adding to the *Liquour* more *Lees* than his own will work ; For though the *Lees* do make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beer* ; And take another Vessel of *New Beer*, and Rack the one Vessel from the *Lees*, and poure the *Lees* of the Racked Vessel into the unracked Vessel, and see the Effect : This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beer*, and put in some Quantity of *Stale Beer* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beer*, and Cutting the Groffer Parts, whereby they may fall down into *Lees*. And this *Instance* again is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquour*, the more thick and troubled the *Liquour* is ; But the longer they be decocted in the *Liquour* ; the clearer it is. The reason is plain, because in *Infusion*, the longer it is, the greater is the Part of the Grois Body, that goeth into the *Liquour* : But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or setteth at the Bottome. And therefore the most Exact Way to *Clarifie* is ; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it : as they do in *Beer*, which hath *Malt* first infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beer*, almost to the very Neck : Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* every day, by the space of Ten Dayes ; and then compare it with another Bottle of the same *Beer* set by. Take also Lime both *Quenched*, and *Unquenched*, and set the Bottles in them, *ut supra*. This *Instance* is referred, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

310 Take *Bottles*, and *Swing* them ; Or *Carry* them in a *Wheel-Barrow*, upon *Rough Ground* ; twice in a day : But then you may not fill the *Bottles* full, but leave some *Air* ; For if the *Liquour* come close to the *Stopples*, it cannot play, nor flower : And when you have shaken them well, either way, pour the *Drink* in another Bottle, Stopped close, after the usual manner ; For if it stay with much *Air* in it, the *Drink* will pall ; neither will it settle so perfectly in all the Parts. Let it stand some 24 houres : Then take it, and put it again into a *Bottle* with *Air*, *ut supra* : And thence into a *Bottle Stopped*, *ut supra* : And so repeat the same *Operation* for seven dayes, Note that in the Emptying of one Bottle into another, you must do it swiftly, lest the *Drink* pall. It were good also, to try it in a *Bottle* with a little *Air* below the Neck, without Emptying. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirits* by *Motion*.

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*), Triall would be made, of *Clarifying* by *Ahesion*, with *Milke* put into *New Beer*, and stirred with it: For it may be, that the *Grosser Part* of the *Beer* will cleave to the *Milk*: The *Doubt* is, whether the *Milk* will sever well again; which is soon tried. And it is usuall in *Clarifying Ippocrass* to put in *Milk*; Which after severeth and carrieth with it the *Grosser Parts* of the *Ippocrass*, as hath been said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beer*, they use to let it pass through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

311

The *Accelerating of Maturation* we will now enquire of. And of *Maturation* it self. It is of three *Natures*. The *Maturation of Fruits*: The *Maturation of Drinkes*: And the *Maturation of Iuppostumes*, and *ulcers*. This last we referre to another *Place*, where we shall handle *Experimentis Medicinall*. There be also other *Maturationes*, as of *Metalls*, &c. whereof we will speak as *Occasion* serveth. But we will begin with that of *Drinkes*, because it hath such *Affinity* with the *Clarification of Liquours*.

Experiments in Confort, touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickning* of *Drinkes*. And next touching the *Maturation* of *Fruits*.

For the *Maturation of Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the *Grosser Parts*: And it is effected partly, by the same meanes; that *Clarification* is, (whereof we spake before;) But then note, that an *Extreme Clarification* doth spread the *Spirits* so *Smooth*, as they become *Dull*, and the *Drink* dead, which ought to have a little *Flouring*. And therefore all your *Clear Amber Drink* is flat.

312

We see the *Degrees of Maturation of Drinkes*; In *Must*; In *Wine*, as it is drunk; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well *Congregated*; *Wine* hath them well united; so as they make the *Parts* somewhat more *Oylie*: *Vinegar* hath them *Congregated*; but more *Jejune*, and in smaller *Quantity*; The greatest and finest *Spirit* and *Part* being exhaled: For we see *Vinegar* is made by setting the *Vessel of Wine* against the hot *Sunne*. And therefore *Vinegar* will not burn; For that much of the *Finer Part* is exhaled.

313

The *Refreshing* and *Quickning* of *Drink* Palled, or *Dead*, is by *Enforcing* the *Motion* of the *Spirit*: So we see that *Open Weather* relaxeth the *Spirits*, and maketh it more lively in *Motion*. We see also *Bottelling* of *Beer*, or *Ale*, while it is *New*, and full of *Spirit*, (so that it spirteth when the *Stopple* is taken forth) maketh the *Drink* more quick and windy. A *Pan* of *Coales* in the *Cellar* doth likewise good, and maketh the *Drink* work again. *New Drink* put to *Drink* that is *Dead*, provoketh it to work again: Nay, which is more, (as some affirme,) *A Brewing of New Beer*, set by *Old Beer*, maketh it work again. It were good also to *Enforce* the *Spirits* by some *Mixtures*, that may excite and quicken them; As by the putting into the *Bottles*, *Nitre*, *Chalk*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by *Putting* in *Cold Water*; which, as it seemeth, getteth down the *Whye*.

314

It is tried, that the *Burying* of *Bottles of Drink* well stopped, either in *dry Earth*, a good depth; Or in the *Bottom* of a *Well* within *Water*; And best of all the *Hanging* of them in a *deep Well* somewhat above the *Water*, for some fortnights space, is an excellent *Meanes* of making *Drink* fresh, and

315

quick

quick: for the *Cold* doth not cause any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the rest that remain: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the Parts of the *Liquour* perfectly.

316 As for the *Maturation of Fruits*; It is wrought by the *Calling forth of the Spirits of the Body outward*, and so *Spreading* them more *smoothly*: And likewise by *Digesting*, in some degree, the *Grosser Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment of Putrefaction*: For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalk*; In *Lime*; Covered over with *Onions*; Covered over with *Crabs*; Closed up in *Wax*; Shut in a *Box*, &c. There was also an *Apple* hanged up in *Smoak*: Of all which the *Experiment* sorted in this Manner:

318 After a *Moneths* Space, the *Apple* Enclosed in *Wax*, was as *Green* and *Fresh* as at the first *Putting in*, and the *Kernells* continued *White*. The *Cause* is, for that all *Exclusion of Open Air*, (which is ever *Predatory*) maintaineth the *Body* in his first *Freshness*, and *Moisture*: But the *Inconvenience* is, that it tasteth a little of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick coated *Fruit*, it would not do.

319 The *Apple* Hanged in the *smoak*, turned like an *Old Mellow Apple* *Wrinkled*, *Dry*, *Soft*, *Sweet*, *Yellow* within. The *Cause* is, for that such a degree of *Heat*, which doth neither *Melt*, nor *Scorch*, (for we see that in a greater *Heat*, a *Roast Apple* Softneth and Melteth, And *Pigs feet*, made of *Quarters of Wardens*; scorch and have a skin of *Cole*) doth *Mellow*, and not *Adure*: The *Smoak* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying of Peares*, and *Prunes*, in the *Oven*, and *Removing* of them often as they begin to *Sweat*, there is a like *Operation*; But that is with a farre more *Intenle* degree of *Heat*.

320 The *Apples* covered in the *Lime* and *Ashes*, were well *Matured*, As appeared both in their *Yellowness*, and *Sweetness*. The *Cause* is, for that that *Degree of Heat* which is in *Lime* and *Ashes*, (being a *smothering Heat*) is of all the rest most *Proper*; for it doth neither *Liquefie*, nor *Arefie*; And that is true *Maturation*. Note that the *Tast* of those *Apples* was good; And therefore it is the *Experiment* fittest for *Use*.

321 The *Apples* Covered with *Crabs*, and *Onions*, were likewise well *Matured*. The *Cause* is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*; which taketh away *Hardness*. So we see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turn the *Apples* first upon a heap. So one *Cluster of Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citius maturescit*.

322 The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the *Other*; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet *Close* and *Smothering*, and which drieth not.

323 The *Apple* in the *Close Box*, was ripened also: The *Cause* is, for that all *Air*, kept close, hath a degree of *Warmth*: As we see in *Wool*, *Fur*, *Plush*, &c.

Note that all these were Compared with another *Apple*, of the same kind, that lay of it Self: And in Comparison of that, were more *Sweet*, and more *Yellow*, and so appeared to be more *Ripe*.

324 Take an *Apple*, or *Pear*, or other like *Fruit*, and *Rowle* it upon a *Table* hard: We see in *Common Experience*, that the *Rowling* doth *Soften* and *Sweeten*

Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the *Parts*: For the *Unequall Distribution* of the *Spirits* maketh the *Harrishness*: But this *Hard Rowling* is between *Concoction*, and a *Simple Maturation*; Therefore, if you should *Rowle* them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would *mature* more finely, and like unto the *Naturall Maturation*.

Take an *Apple*; and cut out a *Peece* of the *Top*, and cover it, to see whether that *Solution of Continuity* will not hasten a *Maturation*: We see that where a *Wasse*, or a *Flie*, or a *Worm* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

325

Take an *Apple*, &c. and prick it with a *Pin* full of *Holes*, not deep, and smear it a little with *Sack*, or *Cinnamon Water*, or *Spirit of wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

326

In these *Trialls also*, as was used in the first, set another of the same *Fruits* by, to *Compare* them: And try them, by their *Yellowness*, and by their *Sweetness*.

The *World* hath been much abused by the *Opinion of Making of Gold*: The *Work* it self I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the *Practice*, full of *Errour* and *Imposture*; And in the *Theory*, full of *unfound Imaginations*. For to say, that *Nature* hath an *Intention* to make all *Metals Gold*: And that, if she were delivered from *Impediments*, she would performe her own work: And that, if the *Crudities*, *Impurities*, and *Leprosities* of *Metals* were cured, they would become *Gold*: And that a little *Quantity* of the *Medicine*, in the *Work of Projection*, will turn a *Sea* of the *Baser Metall* into *Gold*, by *Multipling*: All these are but *dreames*: And so are many other *Grounds of Alchymy*. And to help the *Matter*, the *Alchymists* call in likewise many *Vanities*, out of *Astrology*: *Naturall Magick*: *Superstitious Interpretations of Scriptures*: *Auricular Traditions*: *Faigned Testimonies of Ancient Authors*; and the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the *World* some amends. But we, when we shall come to handle the *Version* and *Transmutation of Bodies*: And the *Experiments* concerning *Metals*, and *Mineralls*: will lay open the true *Wayes* and *Passages of Nature*, which may lead to this great effect. And we commend the wit of the *Chineses*, who despair of *Making of Gold*, but are *Mad* upon the *Making of Silver*: For certain it is, that it is more difficult to make *Gold*, (which is the most *Ponderous* and *Materiate* amongst *Metals*) of other *Metals*, less *Ponderous*, and less *Materiate*: than (*via versa*) to make *Silver* of *Lead*, or *Quick-Silver*: Both which are more *Ponderous* than *Silver*: So that they need rather a further

Experiments
Solitary touch-
ing the Ma-
king of Gold.

ther

ther Degree of *Fixation*, than any *Condensation*. In the mean time, by Occasion of Handling the *Axiomes* touching *Maturati-on*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby turning some of them into *Gold*: For we conceive indeed; that a perfect good *Concoction*, or *Disgestion*, or *Maturati-on* of some *Metalls*, will produce *Gold*. And here we call to mind, that we knew a *Dutch-man*, that had wrought himself into the beleif of a great Person, by undertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Over fired the Work: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a *Subterrany* work, where little *Heat* cometh; But yet more to the *Making* of *Gold*, than of any other *Metal*; And therefore, that he would do it with a great *Lamp*, that should carry a *Temperate* and *Equall* *Heat*: And that it was the *Work* of many *Months*. The *Device* of the *Lamp* was folly; But the *Over-firing* now used; And the *Equall* *Heat* to be required; And the *making* it a *Work* of some good *Time*, are no ill *Discourses*.

We resort therefore to our *Axiomes* of *Maturati-on*, in Effect touched before. The First is, that there be used a *Temperate* *Heat*; For they are ever *Temperate* *Heats* that *Disgest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits* and *Liquours*, which will not work at all upon *Metalls*. The Second is, that the *Spirit* of the *Metal* be quickned, and the *Tangible* *Parts* opened: For without those two *Operations*, the *Spirit* of the *Metal*, wrought upon, will not be able to *disgest* the parts. The Third is, that the *Spirits* do spread themselves *Even*, and move not *subultorily*; For that will make the *Parts* *Close* and *Pliant*. And this requireth a *Heat*, that doth not rise and fall, but continue as *Equall* as may be. The Fourth is, that no *Part* of the *Spirit* be emitted, but detained. For if there be *Emission* of *Spirit*, the *Body* of the *Metal*, will be *Hard*, and *Churlish*. And this will be performed, partly by the *Temper* of the *Fire*: And partly by the closeness of the *Vessel*. The Fifth is, that there be *Choice* made of the *likeliest* and *best* prepared *Metal*, for the *Version*: For that will facilitate the *Work*. The Sixth is, that you give *Time* enough for the *Work*: Not to prolong *Hopes* (as the *Alchymists* do: but indeed to give *Nature* a convenient *Space* to work in. These Principles most certain, and true:

we will now derive a direction of *Trial* out of them, which many(perhaps) by further Meditation, be improved.

Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such as may keep the *Metall* perpetually *Moulten*, and no more; For that above all importeth to the *Work*. For the *Materiall*, take *Silver*, which is the *Metall* that in *Nature* Symbolizeth most with *Gold*; Put in also, with the *Silver*, a Tenth Part of *Quick-Silver*, and a Twelfth Part of *Nitre*, by weight, Both these to quicken and open the *Body* of the *Metall*: And so let the *Worke* be continued by the *Space of Six Moneth*, at the least. I wish also, that there be, as sometimes, an *Injection* of some *Oyled Substance*; Such as they use in the *Recovering of Gold*, which by *Vexing* with *Separations* hath been made *Churlish*: And this is, to lay the *Parts* more *Cloſe* and *Smooth*, which is the *Maine Work*. For *Gold* (as we see) is the *Cloſest* (and therefore the *Heaviest*) of *Metals*: And is likewise the most *Flexible*, and *Tensible*. Note, that to think to make *Gold* of *Quick-silver*, because it is the *heaviest*, is a *Thing* not to be hoped; For *Quick-silver* will not endure the *Mannage* of the *Fire*. Next to *Silver*, I thinke *Copper* were fittest to be the *Materiall*.

Gold hath these *Natures*: *Greatneſſe of Weight*; *Cloſeneſſe of Parts*; *Fixation*; *Plaintneſſ*, or *Softneſſ*; *Immunity from Ruſt*; *Colour* or *Tincture of Yellow*. Therefore the *Sure Way*, (though most about,) to make *Gold*, is to know the *Causes* of the *Severall Natures* before rehearſed, and the *Axiomes* concerning the same. For if a man can make a *Metall*, that hath all these *Properties*, Let men diſpute, whether it be *Gold*, or no?

The *Enducing* and *Accelerating* of *Putrefaction*, is a *Subject* of a very *Univerſall Enquiry*: For *Corruption* is a *Reciprocall to Generation*: And they two, are as *Natures* two *Terms* or *Boundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the *Worke* of the *Spirits* of *Bodies*, which ever are *Unquiet* to *Get forth*, and *Congregate* with the *Aire*, and to enjoy the *Sunnebeams*. The *Getting forth*, or *Spreading* of the *Spirits*, (which is a *Degree* of *Getting forth*,) hath five *Differing Operations*. If the *Spirits* be detained within the *Body*, and move more violently, there followeth *Colliquation*; As in *Metals*, &c. If more Mildely, there followeth *Diſgeſtion*, or *Maturation*; As in *Drinks*, and *Fruits*. If the *Spirits* be not merely *Detained*, but *Protrude* a little, and that *Motion* be *Confused*, and *inordinare*, there followeth *Putrefaction*; Which ever diſſolveth the *Conſiſtence* of the *Body* into much *Inequality*; As in *Fleſh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Ruſt* of *Metals*. But if that *Motion* be in a certain *Order*, there followeth *Virvification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures* *Perſect*. But if the *Spirits* iſſue out of

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Solitary;
touching the
Nature of
Gold.

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Experiments
in Conſort,
touching the
Enducing and
Accelerating
of Putrefaction.

the Body, there followeth *Defecation, Induration, Consumption, &c.*
As in *Brick, evaporation of Bodies Liquid, &c.*

- 329 The Means to *Enduce and Accelerate Putrefaction*, are; First by *Adding some Crude or Watry Moisture*; As in *Wetting* of any *Flesh, Fruit, Wood*, with *Water, &c.* For contrariwise *Unctuous and Oily Substances* preserve.
- 330 The Second is by *Invitation or Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is found: Or when *Dung* (which is a Substance already *Putrified*) is added to other *Bodies*. And this is also notably seen in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other *Earth* will.
- 331 The Third is, by *Clofenesse, and Stopping*, which *detaineth the Spirits*, in *Prison*, more than they would; And thereby irritateth them to seek *Issue*; As in *Corn, and Clothes*, which wax *Musty*; and therefore *Open Aire*, (which they call *Aer perflabilis*) doth preserve: And this doth appear more evidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning the Humours*, which thereupon *Putrifie*.
- 332 The Fourth is, by *Solution of Continuity*; As we see an *Apple* will rot sooner, if it be *Cut or Pierced*. And so will *Wood, &c.* And so the *Flesh* of *Creatures* alive, where they have received any *Wound*.
- 333 The Fifth is, either by the *Exhaling*, or by the *Driving back* of the *Princicall Spirits*, which preserve the *Consistence of the Body*; So that when their *Government* is dissolved, every *Part* returneth to his *Nature, or Homogeny*. And this appeareth in *Urine, and Blood*, when they coole, and thereby break; It appeareth also in the *Gangrene, or Mortification of Flesh*, either by *Opiates*, or by *Intense Colds*. I conceive also the same Effect is in *Pestilences*, for that the *Malignity* of the *Infecting Vapour*, daunteth the *Princicall Spirits*, and maketh them *flie*, and leave their *Regiment*; And then the *Humours, Flesh, and Secondary Spirits*, do dissolve, and break, as in an *Anarchy*.
- 334 The Sixth is, when a *Forraine Spirit, Stronger and more Eager than the Spirit of the Body, entreteth the Body*; As in the *Stinging of Serpents*. And this is the *Cause* (generally) that upon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* it self, *Congregate* too much; As upon *Blows, and Bruises*; or when they are *Pennto much*, as in *Swelling* upon *Cold*. And we see also, that the *Spirits* coming of *Putrefaction* of *Humours* in *Agues, &c.* Which may be counted as *Forrein Spirits*, though they be bred within the *Body*, do *Extinguish and Suffocate the Naturall Spirits, and Heat*.
- 335 The Seventh is, by such a *Weak Degree of Heat, as setteth the Spirits in a little Motion, but is not able, either to digest the Parts, or to Issue the Spirits*; As is seen in *Flesh* kept in a *Room* that is not *Coole*; Whereas in a *Coole and Wet Larder* it will keep longer. And we see, that *Vivification* (whereof *Putrefaction* is the *Bastard-Brother*,) is effected by such *Soft Heats*; As the *Hatching of Eggs*; The *Heat of the Womb, &c.*
- 336 The Eighth is, by the *Releasing of the Spirits*, which before were close kept by the *Solidnesse* of their *Couverture*, and thereby their *Appetite* of *Issuing* checked; As in the *Artificiall Rusts* induced by strong *Waters, in Iron, Lead, &c.* And therefore *Wetting* hasteneth *Rust, or Putrefaction* of any thing, because it softneth the *Crust*, for the *Spirits* to come forth.
- 337 The Ninth is, by the *Enterchange of Heat and Cold, or Wet and Dry*; As we see in the *Mouldring of Earth* in *Frosts, and Sunne*; And in the more hasty *Rotting of Wood*, that is sometimes wet, sometimes dry.

The Tenth is, by *Time, and the Work and Procedure of the Spirits themselves*, which cannot keep their Station; Especially if they be left to themselves, And there be not Agitation or Locall Motion. As we see in Corn not stirred; And Mens Bodies not exercised. 338

All Moulds are Inceptions of *Putrefaction*; As the Moulds of *Pyes*, and *Flesh*, the Moulds of *Orenges*, and *Limmons*; which Moulds afterwards turn into Worms, or more odious *Putrefactions*; And therefore (commonly) prove to be of ill Odour. And if the Body be Liquid, and not apt to putrefie totally, it will cast up a *Mother* in the Top; As the *Mothers of Distilled Waters*, 339

Mosse is a Kind of *Mould*, of the Earth and Trees. But it may be better forced as a *Rudiment of Germination*; To which we referre it. 340

It is an *Enquirie of Excellent use*, to Enquire of the *Means of Preventing or Staying of Putrefaction*; For therein consisteth the *Means of Conservation of Bodies*; For *Bodies* have two *Kindes of Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions of the Bodies of Men, and Living Creatures* (as in *Agues, Worms, Consumptions of the Lungs, Impostums, and Vlcers both Inwards and Outwards*) they are a great *Part of Physick, and Surgery*; And therefore we will reserve the *Enquiry of them to the proper Place, where we shall handle Medicinall Experiments of all Sorts*. Of the rest we will now Enter into an *Enquiry*; wherein much light may be taken, from that which hath been said, of the *Means to Enduce or Accelerate Putrefaction*: For the *Removing that, which caused Putrefaction, doth Prevent and Avoid Putrefaction*.

Experiments in Consort, touching Prohibiting and Preventing Putrefaction.

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The First *Means of Prohibiting or Checking Putrefaction, is Cold*: For so we see that *Meat and Drink* will last longer, *Unputrified, or Unfowred*, in *Winter*, than in *Summer*: And we see that *Flowers, and Fruits*, put in *Conservatories of Snow*, keep fresh. And this worketh by the *Detention of the Spirits, and Conspiration of the Tangible Parts*. 341

The Second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* do inhibit *Putrefaction*: And by the same reason of *Astringency*, some small *Quantity of Oile of Vitrioll*, will keep *Fresh Water* long from *Putrifying*. And this *Astriction* is in a *Substance that hath a Virtuall Cold*, And it worketh (partly) by the same *Means that Cold doth*. 342

The Third is, the *Excluding of the Aire*, And again, the *Exposing to the Aire*: For these *Contraries*, (as it cometh often to passe,) work the same *Effect*, according to the *Nature of the Subject-Matter*. So we see, that *Beer, or Wine*, in *Bottles close stopped*, last long; That the *Garners under Ground* keep *Corn* longer than those above *Ground*; And that *Fruit closed in Wax* keepeth fresh: And likewise *Bodies* put in *Honey, & Flower*, keep more fresh: And *Liquors, Drinks, and Fuyces*, with a little *Oyle* cast on the *Top*, keep fresh. Contrariwise, we see that *Cloth and Apparell*, not *Aired*, do breed *Moaths, and Mould*; and the *Diversitie* is, that in *Bodies* 343

that need *Detention of Spirits*, the *Exclusion of the Aire* doth good; As in *Drinks*, and *Corn*: But in *Bodies* that need *Emission of Spirits* to discharge some of the *Supuerfluous Moisture*, it doth hurt, for they require *Airing*.

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The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For the *Subtill Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* *Integrall*, and their *Parts* together; As we see that *Turning over of Corn* in a *Garner*; Or *Letting* it runne like an *Houre-glasse*, from an upper *Room* into a *Lower*, doth keep it *Sweet*: And *Running Waters* putrifie not: And in *Mens Bodies*, *Exercise* hindereth *Putrefaction*; And contrary wise *Rest*, and *Want of Motion*, or *Stoppings*; (whereby the *Runne of Humours*, or the *Motion of Perspiration*, is stayed,) further *Putrefaction*; As we partly touched a little before.

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The Fifth is, the *Breathing forth of the Adventitious Moisture in Bodies*, For as *Wetting* doth hasten *Putrefaction*; So *Convenient Drying*, (whereby the more *Radicall Moisture* is only kept in,) putteth back *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the *Shade*; or dried in the hot *Sunne*, for a small time, keep best. For the *Emission of the Loose and Adventitious Moisture*, doth betray the *Radicall Moisture*; And carryeth it out for *Company*.

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The Sixth is, the *Strengthening of the Spirits of Bodies*, For as a *Great Heat* keepeth *Bodies* from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a *Strong Spirit* likewise preserveth, and a *Weak or Faint Spirit* disposeth to *Corruption*. So we find that *Salt water* corrupteth not so soon as *Fresh*: And *Salting of Oysters*, and *Powdring of Meat*, keepeth them from *Putrefaction*. It would be tried also, whether *Chalk* put into *Water*, or *Drink*, doth not preserve it from *Putrefying*, or speedy *Souring*. So we see that *Strong Beer* will last longer than *Small*, And all things, that are *Hot* and *Aromaticall*, do help to Preserve *Liquours*, or *Powders*, &c. Which they do, as well by *Strengthening the spirits*, as by *Soaking out the loose Moisture*.

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The Seventh is, *Separation of the Cruder Parts*, and thereby making the *Body more Equall*; for all unperfect *Mixture* is apt to *Putrefie*; And *Watry Substances* are more apt to *Putrefie*, than *Oily*. So we see *Distilled Waters* will last longer than *Raw waters*; And *Things* that have passed the *Fire*, do last longer than those that have not passed the *Fire*; as *Dried Pears*, &c.

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The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and Watrey Moisture*; Not onely for the Reason before given, that it provoketh the *Radicall Moisture* to come forth with it; But because being detained in the *Body*, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming of dead Bodies*: And the same Reason is of *Preserving Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

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The Ninth is, the *Commixture of any Thing that is more Oily, or Sweet*: For such *Bodies* are least apt to *Putrifie*; the *Aire* working little upon them; And they not putrefying preserve the rest. And therefore we see *Syrups*, and *Ointments*, will last longer, than *Fuyces*.

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The Tenth is, the *Commixture of somewhat that is Drie*, For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is dry is unapt to putrefie: And therefore *Smoak* preserveth flesh; As we see in *Bacon*, and *Neats-Tongues*, and *Martlemas Beefe*, &c.

The Opinion of some of the *Ancients*, that *Blown Aires* do preserve Bodies, longer than other *Aires*, seemeth to Me Probable; For that the *Blown Aires*, being Over-charged and Compressed, will hardly receive the Exhaling of any Thing, but rather repulse it. It was tried in a *Blown Bladder*, whereinto Flesh was put, and likewise a Flower, and it forted not: For *Dry Bladders* will not *Blow*. And *New Bladders* rather further *Putrefaction*: The way were therefore, to blow strongly, with a Paire of Bellows, into a Hog-head, putting into the Hoghead (before) that which you would have preserved; And in the instant that you withdraw the Bellows, stop the Hole close.

THe Experiment of *Wood* that *Shineth* in the *Dark*, we have diligently driven, and pursued: The rather, for that of all Things, that give Light here below, it is the most Durable; And hath least Apparent Motion. *Fire* and *Flame* are in continual Expende; *Sugar* shining only while it is in Scraping; And *Salt-Water* while it is in Dashing; *Glo-Worms* have their Shining while they live, or a little after; Onely *Scales of Fishes* (Putrefied) seem to be of the same Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* forted thus. 1. The *Shining* is in some Pieces more *Bright*, in some more *Dimme*; but the most *Bright* of all doth not attain to the Light of a *Glo-worm*. 2. The *Woods* that have been tried to shine, are chiefly *Sallow*, and *Willow*; Also the *Ash*, and *Hassle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* do shine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in some Pieces *White*, in some Pieces inclining to *Red*; Which in the Country they call the *White*, and *Red Carret*. 5. The Part that Shineth, is, (for the most Part) somewhat *Soft*, and *Moist* to feel to; But some was found to be *Firme* and *Hard*; So as it might be figured into a *Crosse*, or into *Beads*, &c. But you must not look to have an Image, or the like, in any Thing that is *Lightsome*; For even a face in Iron red Hot will not be seen, the Light confounding the small differences of *Lightsome* and *Darksome*, which shew the figure. 6. There was the *Shining Part* pared off, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* began also to Shine, being laid abroad in the Dew; So as it seemeth the *Putrefaction* spreadeth. 7. There was other dead *Wood* of like kinde, that was *Laid abroad*, which *Shined* not at the first, But after a Nights lying abroad began to shine. 8. There was other *Wood*, that did *First Shine*; And being laid dry in the House, within five or six dayes, *Lost the Shining*; And laid abroad again, *Recovered the Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seven night, lost their Shining; But being laid in a *Cellar*, or *Dark Room*, kept the *Shining*. 10. The *Boring of Holes*, in that kind of *Wood*, and then laying it abroad, seemeth to conduce to make it *Shine*: The *Cause* is, for that all *Solution* of *Continuity* doth help on *Putrefaction*, as was touched before. 11. No *Wood* hath been yet tried to *Shine*, that was cut *down alive*, but such as was *Rooted*, both in *Stock*, and *Root*, while it grew. 12. Part of the *Wood* that *Shined*, was *steeped* in *Oyle*, and retained the *Shining* a Fortnight. 13. The like succeeded in some *Steeped* in *Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* be *laid abroad every Night*, and *taken in* and *Sprinkled* with *Water* in the *Day*, is not yet tryed. 15. *Triall* was made of *laying it abroad* in *Frostie* weather, which hurt it not. 16. There was a great *Piece* of a *Root*, which did shine, and the *Shining Part* was *Cut off*, till no more

Experiment
Solitary,
touching *Wood*
Shining in the
Dark.

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Shined; Yet after two Nights, though it were kept in a drie Room, it got a *Shining*.

Experiment
Solitary,
touching the
Acceleration
of Birth.

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THe *Bringing forth of Living Creatures* may be *Accelerated* in two Respects: The one, if the *Embryon ripeneth* and perfecteth sooner: The other, if there be some Cause from the *Mothers Body*, of *Expulsion* or *Putting it down*: whereof the Former is good, and argueth Strength; The Latter is ill, and cometh by Accident or Disease. And therefore the Ancient *Observation* is true, that the *Child born in the seventh Moneth*, doth commonly well; But *Born in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is *Fabulous*; Which is, that in the Eighth Moneth, should be the return of the Reign of the *Planet Saturn*: which (as they say) is a *Planet Maligne*; whereas in the Seventh is the Reign of the *Moon*, which is a *Planet Propitious*. But the true *Cause* is, for that where there is so great a *Prevention* of the Ordinary time, it is the *lustinesse* of the *Child*; But when it is lesse, it is some *indisposition* of the *Mother*.

Experiment
Solitary,
touching the
Acceleration
of Growth and
Stature.

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TO *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plenty* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickning* and *Exciting* of the *Naturall Heat*. For the first, *Excesse* of *Nourishment* is hurtfull; For it maketh the *Childe* *Corpulent*; And *Growing* in *Breadth*, rather than in *Height*. And you may take an *Experiment* from *Plants*, which, if they spread much, are seldom tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore *Children* in *Dayrie Countries* do wax more tall, than where they feed more upon *Bread*, and *Flesh*. There is also a received *Tale*; That *boyling* of *Daise Roots* in *Milke* (which it is certain are great *Driers*) will make *Dogs* little. But so much is true, that an *Over-Drie Nourishment* in *Childhood* putteth backe *Stature*. Secondly, the *Nourishment* must be of an *Opening Nature*; For that *Attenuateth* the *Juyce*, and furthereth the *Motion* of the *Spirits*, upwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their *Feeding* upon *Cardamon*; which (he saith) made them grow better, and be of a more *Active Habit*. *Cardamon* is in *Latine Nasurtium*; And with us *Water-Cresses*; Which, it is certain, is an *Herb*, that whilest it is young, is *Friendly* to *Life*. As for the *Quickning* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much *Going* to *Schoole*, where they fit so much, hindereth the *Growth* of *Children*; whereas *Country-People*, that go not to *Schoole*, are commonly of better *Stature*. And again, *Men* must beware how they give *Children*, any thing that is *Cold* in *Operation*; For even *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath been tryed, that a *Whelp*, that hath been fed with *Nitre* in *Milk*, hath become very little, but extream lively: For the *Spirit* of *Nitre* is *Cold*. And though it be an *Excellent Medicine*, in *Strength* of years, for *Prolongation* of *Life*; yet it is, in *Children* and young *Creatures*, an *Enemy* to *Growth*: And all for the same Reason; For *Heat* is requisite to *Growth*: But after a *Man* is come to his *Middle Age*, *Heat* consumeth the *Spirits*; which the *Coldnesse* of the *Spirit* of *Nitre* doth help to *condense*, and *correct*.

There bee two *Great Families* of *Things*; You may terme them by severall Names; *Sulphureous* and *Mercureall*, which are the *Chymists* Words: (For as for their *Salt*, which is their *Third Principle*,

Experiments
in Consort,
touching *Sulphur* and *Mercury*, two of
Paracelsus
Principles.

Principle, it is a Compound of the other two;) *Inflammable*, and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For we see that in *Subterrancies* there are, as the *Fathers* of their *ribes*, *Brimstone* and *Mercury*; In *Vegetables*, and *Living Creatures* there is *Water* and *Oile*: In the *Inferiour Order* of *Pneumatics* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these *Paires*, though they be unlike in the *Primitive Differences* of *Matter*, yet they seem to have many *Consents*: For *Mercury* and *Sulphure* are principall *Materials* of *Metals*; *Water* and *Oyle*, are principall *Materials* of *Vegetables*, and *Animals*; And seem to differ but in *Maturation*, or *Concoction*: *Flame* (in *Vulgar Opinion*) is but *Aire Incensed*; And they both have *Quicknesse* of *Motion*, and *Facilitie* of *Cession*, much alike: And the *Interstellar Sky*, though the *Opinion* be vain, that the *Starre* is the *Denser Part* of his *Orbe*,) hath notwithstanding so much *Affinity* with the *Starre*, that there is a *Rotation* of that, as well as of the *Starre*. Therefore, it is one of greatest *Magnalia Naturæ*, to turne *Water* or *Watry Iuyce* into *Oile* or *Oily Iuyce*: Greater in *Nature*, than to turn *Silver*, or *Quick-Silver*, into *Gold*:

The *Instances* we have, wherein *Crude* and *Watery Substance* turneth into *Fat* and *Oily*, are of four *kinde*s. First in the *Mixture* of *Earth* and *Water*, which mingled by the help of the *Sunne*, gathered a *Nitrous Fatnesse*, more than either of them have severally; As we see, in that they put forth *Plants*, which need both *Juyces*.

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The *Second* is in the *Affimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures*; Whereof *Plants* turn the *Juyce* of meer *Water* and *Earth*, into a great deal of *Oily Matter*: *Living Creatures*, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they *Affimilate* also in a *Measure* their *Drink* of *Water*, &c. But these two *Wayes* of *Version* of *Water* into *Oile*, (namely by *Mixture* and by *Affimilation*) are by many *Passages*, and *Percolations*, and by long *Continuance* of soft *Heats*, and by *Circuits* of *Time*.

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The *third* is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which have a *kinde* of *Fatnesse*, or *Oyle*.

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The *fourth* is in the *Dulcoration* of some *Metals*; as *Saccharum Saturni*, &c.

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The *Intension* of *Version* of *Water* into a more *Oily Substance*, is by *Digestion*; For *Oile* is almost *Nothing* else but *Water Digested*; And this *Digestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Again, it may be by *Provocation*, or *Excitation*; Which is caused by the *Mingling* of *Bodies* already *Oily*, or *Digested*; For they will somewhat *Communicate* their *Nature* with the rest. *Digestion* also is strongly effected by direct *Affimilation*, of *Bodies Crude* into *Bodies Digested*; As in *Plants*, and *Living Creatures*, whose *Nourishment* is farre more *Crude* than their *Bodies*:

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dies: But this *Disgestion* is by a great *Compasse*, as hath been said. As for the more full Handling of these two Principles, whereof this is but a Taste, (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leave it to the *Title of Version of Bodies*; And likewise to the *Title of the First Congregations of Matter*; Which like a Generall Assembly of Estates, doth give Law to all *Bodies*.

Experiment
Solitary, touch-
ing *Chamele-*
ons.

360

A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*; His Head unproportionably bigge; His eyes great: He moveth his Head without the writhing of his Neck; (which is inflexible,) as a *Hogge* doth: His Back crooked; His Skinne spotted with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath five Fingers; Three on the Outside, and two on the Inside; His Tongue of a marvellous Length in respect of his Body, and hollow at the end; which he will launch out to prey upon *Flies*. Of Colour Green and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If he be laid upon Green, the Green predominateth; If upon Yellow, the Yellow; Not so, if he be laid upon Blew, or Red, or White; Only the Green Spots receive a more Orient Lustre; Laid upon Black, he looketh all Black, though not without a Mixture of Green. He feedeth not only upon Aire, (though that be his principal Sustenance;) For sometimes he taketh *Flies*, as was said; Yet some that have kept *Chameleons* a whole year together, could never perceive that ever they fed upon any Thing else but Aire; And might observe their Bellies to swell after they had exhausted the Aire, and closed their Jawes; Which they open commonly against the Rayes of the Sunne. They have a foolish Tradition in *Magick*, that if a *Chameleon* be burnt upon the Top of an House, it will raise a Tempest, Supposing (according to their vain Dreams of *Sympathies*) because he nourisheth with Aire. his Body should have great vertue to make Impression upon the Aire.

Experiment
Solitary,
touching *Sub-*
terrany Fires.

361

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions of Flames* out of *Plaines*; And that those *Flames* are clear, and cast not forth such Smoak, and ashes, and Pumice, as *Mountaine Flames* do. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountains*, and *Earth-quakes* which cast *Flame*. There be also some *Blind Fires*, under *Stone*, which flame not out, but *Oile* being powred upon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remove the *Stone*, it is *Heat* rather than *Flame*; Which neverthelesse is sufficient to Enflame the *Oile*.

Experiment
Solitary, touch-
ing *Nitre*.

362

IT is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foule Cloaths be put into it, it scoureth them of it self: And if they stay any whit long, they moulder away. And the scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And we see *Warm Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which severeth and divideth any thing that is foule, and Viscous, and sticketh upon a Body.

Experiment
Solitary, touch-
ing *Congelating*
of *Aire*.

363

Take a *Bladder*, the greatest you can get; Fill it full of Wind, and tye it about the Neck with a Silk thred waxed; And upon that likewise Wax very close; So that when the Neck of the *Bladder* drieth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Vault*, or in a *Conservatory of Snow*, the *Snow* being made hollow about the *Bladder*;

Bladder; And after some Fortnights distance, see whether the *Bladder* be shrunk: For if it be, then it is plain, that the *Coldnesse* of the *Earth* or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Consequence.

IT is a Report of some good credit, that in *Deep Caves*, there are *Penfils* *Chryftall*, and *Degrees* of *Chryftall* that drop from above; And in some other, (though more rarely) that rise from below. Which though it be chiefly the Work of Cold, yet it may be, that *Water*, that passeth thorow the *Earth*, gathereth a Nature more clammy, and fitter to Congeale, and becomes Solid, than *Water* of it self. Therefore *Triall* would be made, to lay a Heap of *Earth*, in great Frosts, upon a *Hollow Vessell*, putting a *Canvase* between, that it falleth not in: And poure *Water* upon it, in such *Quantity* as will be sure to soak thorow; And see whether it will not make an harder *Ice* in the bottome of the *Vessell*, and lesse apt to dissolve, than ordinarily. I suppose also, that if you make the *Earth* narrower at the bottome, than at the *Top*, in fashion of a *Sugar Loafe* Reversed, it will help the *Experiment*. For it will make the *Ice*, where it isfueth, lesse in *Bulk*; And evermore *Smalnesse* of *Quantity* is a *Help* to *Version*.

TAKE *Damask Roses*, and pull them; Then drie them upon the *Top* of an *Houie*, upon a *Lead* or *Tarras*, in the *Hot Sun*, in a clear day, between the *Houres* (onely) of twelve and two, or thereabouts. Then put them into a *Sweet Drie Earthen Bottle*, or a *Glasse* with narrow *Mouthes*, stuffing them close together, but without *Bruising*: Stop the *Bottle*, or *Glasse*, close, and these *Roses* will retain, not only their *Smell* Perfect, but their *Colour* fresh, for a year at least. Note, that *Nothing* doth so much destroy any *Plant*, or other body, either by *Putrefaction*, or *Arefaction*, as the *Adventitious Moisture*, which hangeth loose in the *Body*, if it be not drawn out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture* along with it, when it self goeth forth. And therefore in *Living Creatures*, *Moderate Sweat* doth preserve the *Juyce* of the *Body*. Note that these *Roses*, when you take them from the *Drying* have little or no *Smell*; So that the *Smell* is a *Second Smell*, that isfueth out of the *Flower* afterwards.

THE *Continuance* of *Flame*, according unto the diversity of the *Body Enflamed*, and other *Circumstances*, is worthy the *Enquiry*; Chiefly, for that though *Flame* be (almost) of a *Momentary Lasting*, yet it receiveth the *More*, and the *Lesse*: we will first therefore speake (at large) of *Bodies Enflamed*, wholly, and *Immediately*, without any *Wicke* to help the *Inflammati-on*. A *Spoonful* of *Spirit of Wine*, a little heated, was taken, and it burnt as long as came to 116. *Pulses*. The same *Quantity* of *Spirit of Wine*, Mixed with the *Sixth Part* of a *Spoonful* of *Nitre* burnt but to the space of 94. *Pulses*. Mixed with the like *Quantity* of *Bay-salt*, 83. *Pulses*. Mixed with the like *Quantity* of *Gunpowder*, which dissolved into a *Black water*, 110. *Pulses*. A *Cube*, or *Pellet of Yellow Wax*, was taken, as much as half the *Spirit of Wine*, and set in the *Middest*, and it burnt only to the space of 87. *Pulses*. Mixed with the *Sixth Part* of a *spoonful* of *Milk*, it burnt to the space of 100. *Pulses*; And the *Milk* was cruded. Mixed with the *Sixth Part* of a *spoonful* of *Water*, it burnt to the space of 86. *Pulses*; With an *Equal Quantity* of *Water*, onely to the space of 4. *Pulses*. A small *Pebble* was laid in the *Middest*, and the *Spirit of Wine* burnt to the space of 94. *Pulses*.

Experiment Solitary, touching Congealing of Water into Chryftall.

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Experiment Solitary, touching Preserving of Rose leaves both in Colour and Smell.

365

Experiments in Consort, touching the Continuance of Flame.

366

Pulses. A Piece of *Wood*, of the Bignesse of an Arrow, and about a Fingers length, was set up in the Middest, and the *Spirit of Wine* burnt to the space of 94 Pulses. So that the *Spirit of Wine Simple*, endureth the longest; And the *Spirit of Wine* with the *Bay-salt*, and the *Equall Quantity of Water*, were the shortest.

367 Consider well, whether the more speedy *Going forth of the Flame*, be caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Aversion* thereof to take *Flame*: Which will appear by the *Quantity* of the *Spirit of Wine*, that remaineth after the going out of the *Flame*. And it seemeth clearly to be the latter; For that the *Mixture* of Things least apt to burne, is the *Speediest* in going out, And note, by the way, that *Spirit of Wine* burned, till it go out of it self, will burn no more; And tasteth nothing so hot in the Mouth as it did; No nor yet sowre, (as if it were a degree towards *Vinegar*,) which *Burnt wine doth*, but flat and dead.

368 Note, that in the *Experiment of Wax* aforesaid, the *Wax* dissolved in the burning, and yet did not incorporate it self, with the *Spirit of Wine*, to produce on *Flame*; but wheresoever the *Wax* floated, the *Flame* forsook it, till at last it spread all over, and put the *Flame* quite out.

369 The *Experiments* of the *Mixtures* of the *Spirit of Wine enflamed*, are Things of discovery, and not of Use : But now we will speak of the *Continuance of Flames*, such as are used for *Candles*, *Lamps*, or *Tapers*; consisting of *Inflammable Matters*, and of a *Wick* that provoketh *Inflammation*. And this importeth not only *Discovery*, but also *Use* and *Profit*; For it is a great *Saving* in all such *Lights*, if they can be made as faire and right as others, and yet last longer. *Wax Pure* made into a *Candle*, and *Wax Mixed* severally into *Candle stufte*, with the *Particulars* that follow; (*viz. Water, Aqua-vita, Milk, Bay-salt, Oyle, Butter, Nitre, Brimstone, Saw-dust,*) Every of these bearing a *Sixth Part* to the *Wax*; And every of these *Candles Mixed*, being of the same *Weight* and *Wicke*, with the *Wax Pure*, proved thus in the *Burning*, and *Lasting*. The *Swiftest* in *Consuming* was that with *Saw dust*; Which first burned faire till some part of the *Candle* was consumed, and the *Dust* gathered about the *Snafte*; But then it made the *Snafte* big, and long, and to burn duskishly, and the *Candle* wasted in half the time of the *Wax Pure*. The next in *Swiftnesse*, were the *Oyle*, and *Butter*, which consumed, by a *Fifth part*, swifter than the *Pure Wax*. Then followed in *Swiftnesse* the *Cleare Wax* it self. Then the *Bay-Salt*, which lasted about an *Eighth part* longer than the *Cleare Wax*. Then followed the *Aqua-vita*, which lasted about a *Fifth part* longer than the *Cleare Wax*. Then follow the *Milk*, and *Water*, with little difference from the *Aqua-vita*, but the *Water* slowest. And in these four last, the *Wicke* would spit forth little *Sparks*. For the *Nitre*, it would not hold lighted above some *Twelve Pulses*: But all the while it would spit out *Portions of Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same with the *Nitre*; But then after a little while; it would harden and cake about the *Snafte*; So that the *Mixture* of *Bay-salt* with *Wax*, will winne an *Eight part* of the time of *lasting*, and the *Water* a *Fifth*.

370 After the *Several Materials* were tried, *Triall* was likewise made of severall *Wickes*; As of *Ordinary Cotton*, *Sowing Thred*, *Rush*, *Silk*, *Straw*, and *Wood*. The *Silk*, *Straw*, and *Wood*, would flame a little, till they came to the *Wax*, and then go out: of the *Other Three*, the *Thred* consumed faster than the *Cotton*, by a *Sixth part* of *Time*: The *Cotton* next: Then the *Rush* consumed

sumed flower than the *Cotton*, by at least a third part of time. For the Bignesse of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike, and the *Rush* much lesse, and dimmer. *Quere*; whether *Wood*, and *Wiek*es both, as in *Torches*, consume faster, than the *Wiek*es *Simple*?

We have spoken of the Several *Materials*; and the Several *Wiek*es. But to the *lasting* of the *Flame*, it importeth also; Not only what the *Material* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Hou*swives, to make their *Candles* burn the longer, use to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the flower: In so much, as by this means, they will out-last other *Candles*, of the same *stuf*fe, almost Half in Half. For *Bran* and *Flower* have a *Vertue* to Harden: So that both Age, and lying in the *Bran*, doth help to the *Lasting*. And we see that *Wax-Candles* last longer then *Tallow-Candles*, because *wax* is more firme, and hard.

The *Lasting* of *Flame* also dependeth upon the *ease* *Drawing* of the *Nourishment*; As we see in the *Court of England*, there is a service which they call *All-night*; which is (as it were) a great *Cake* of *wax*, with the *wieke* in the *Middst*; whereby it cometh to passe, that the *Wieke* fetcheth the *Nourishment* further off. We see also that *Lamps* last longer, because the *vessell* is farre broader, than the *Bredth* of a *Taper*, or *Candle*.

Take a *Turreted Lamp* of *Tinne*, made in the forme of a *Squire*; The *Height* of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lamp* standeth: Make only one *Hole* in it, at the *End* of the *Return* furthest from the *Turret*. Reverse it, and fill it full of *Oile*, by that *Hole*; And then set it upright again; And put a *Wiek* in at the *Hole*; And lighten it: You shall finde, that it will burn slow, and a long time: Which is caused, (as was said last before,) for that the *Flame* fetcheth the *Nourishment* a farre off. You shall finde also, that as the *Oile* wasteth, and descendeth, so the *Top* of the *Turret*, by little and little, filleth with *Aire*, which is caused by the *Rarefaction* of the *Oile* by the *Heat*. It were worthy the *Observation*, to make a *Hole*, in the *Top* of the *Turret*, and to trie, when the *Oile* is almost consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good also to have the *Lamp* made, not of *Tinne*, but of *Glasse*, that you may see how the *Vapour*, or *Aire* gathereth, by degrees, in the *Top*.

A *Fourth* point, that importeth the *lasting* of the *Flame*, is the *Clofeness* of the *Aire*, wherein the *Flame* burneth. We see, that if *Wind* bloweth upon a *Candle*, it wasteth apace. We see also, it lasteth longer in a *Lantern*, than at *large*. And there are *Traditions* of *Lamps*, and *Candles*, that have burnt a very long time, in *Caves*, and *Tombes*.

A *Fifth* Point, that importeth the *Lasting* of the *Flame*, is the *Nature* of the *Aire*, where the *Flame* burneth; whether it be *Hot* or *Cold*; *Moist* or *Drie*. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burn more fiercely; (As *Fire* scorseth in *Frostie* weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burn more mildly, and so helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Moist*, doth in a *Degree* quench the *Flame*; (As we see *Lights* will go out in the *Damps* of *Mines*;) And howsoever maketh it burn more dully: And so helpeth the *Continuance*.

Burials in *Earth* serve for *Preservation*; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may

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Experiments
in Confort,
touching *Burials*
or *Infusions*
of divers *Bodies*
in *Earth*.

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may bury the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane, &c.* And the like you may do for *Conservation*, if the *Bodies* be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preservation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must *Vault* the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them; it will do more hurt, by the *Moisture*, causing them to putrifie, than good by the *virtuall Cold*, to conserve them; Except the *Earth* be very Drie, and Sandy.

377 An *Orange, Limmon, and Apple*, wrapt in a Linnen Cloth, being buried for a Fortnights Space, foure Foot deep within the *Earth*, though it were in a Moist Place, and a Rainy Time, yet came forth, no wayes mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Juyce somewhat flatted. But with the *Buriall* of a Fortnight more they became Putrified.

378 A *Bottle of Beer*, buried in like manner, as before, became more lively, better tasted, and Clearer, than it was. And a *Bottle of Wine* in like manner. A *Bottle of Vinegar*, so buried, came forth more lively, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and lively, if not better than before.

379 It were a profitable *Experiment*, to preserve *Oranges, Limmons, and Pomegranates*, till Summer; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessel, well covered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conservatory of Snow*. And generally, whosoever will make *Experiments of Cold*, let him be provided of three Things; A *Conservatory of Snow*; A good large *Vault*, twenty foot at least under the Ground; And a *Deep Well*,

380 There hath been a Tradition, that *Pearl, and Corall, and Surchois-Stone*, that have lost their Colours, may be recovered by *Burying* in the *Earth*. Which is a thing of great profit, if it would sort: But upon Trial of Six Weeks *Buriall*, there followed no Effect. It were good to trie it, in a *Deep Well*; Or in a *Conservatory of Snow*, where the Cold may be more Constringent; And so make the *Body* more united, and thereby more resplendent.

Experiments
Solitary
touching the
Affeſts in
Mens Bodies
from severall
Winds.

381

Mens *Bodies* are heavier, and lesse disposed to Motion, when *Southern Winds* blow, than when *Northern*. The *Cause* is, for that when the *Southern Winds* blow, the *Humours* do (in some Degree) melt, and waxe fluid, and so flow into the Parts; As it is seen in *Wood*, and other *Bodies*, which when the *Southern Winds* blow, do swell. Besides, the Motion and Activity of the *Body* consisteth chiefly in the *Sinews*, which, when the *Southern Wind* bloweth, are more relax.

Experiment
Solitary touch-
ing Winter and
Summer Sick-
nesses.

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IT is commonly seen, that more are *Sick* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly raigin in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*; But then they are Cured most by *Sweat, and Purge*; which in the *Summer* cometh on, or is provoked, more Easly: As for *Pestilent Diseases*, the Reason why most *Dye* of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most danger in the *Winter*.

THe Generall Opinion is, that *Years Hot and Moist*, are most *Pestilent*; Upon the Superficial Ground, that *Heat and Moisture* cause *Putrifaction*. In *England* it is found not true; For, many times, there have been great *Plagues* in *Dry Years*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Airs*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly,) and maketh them less wholesome. And again in *Barbary*, the *Plagues* break up in the *Summer-moneths*, when the *Weather* is *Hot and Dry*.

MAny *Diseases*, (both *Epidemicall*, and others,) break forth at *Particular times*. And the Cause is falsly imputed to the *Constitution* of the *Air*, at that time, when they break forth, or reign; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Year*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue upon the *Nature* of the *Precedent four Seasons* of the *Year*.

TRiall hath been made, with *Earthen Bottles*, well stopped, hanged in a *Well* of *Twenty Fathom* deep, at the least; And some of the *Bottles* have been let down into the *Water*, some others have hanged above, within about a fathom of the *Water*; And the *Liquors* so tried have been, *Beer*, (not *New*, but *Ready* for drinking,) and *Wine*, and *Milk*. The Proof hath been, that both the *Beer*, and the *Wine*, (as well within *Water*, as above,) have not been palled or deaded at all; But as good, or somewhat better than *Bottles* of the same *Drinks*, and *Staleness*, kept in a *Celler*. But those which did hang above *Water*, were apparently the best; And that *Beer* did flower a little; whereas that under *Water* did not, though it were *Fresh*. The *Milk* flowered, and began to Putrifie. Nevertheless it is true, that there is a *Village* near *Blois*, where in *Deep Caves* they do thicken *Milk*; In such sort, that it becometh very pleasant; Which was some Cause of this *Trial* of *Hanging Milk* in the *Well*: But our proof was naught; Neither do I know, whether that *Milk* in those *Caves*, be first boyled. It were good therefore to trie it with *Milk Souden*, and with *Creame*; For that *Milk* of it self is such a *Compound Body*, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolved. It were good also to trie the *Beer*, when it is in *Wort*, that it may be seen, whether the *Hanging* in the *Well*, will Accelerate the *Ripening* and *Clarifying* of it.

DIvers, we see, do *Stut*. The Cause may be, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is less apt to move. And therefore we see, that *Naturalls* do generally *Stut*: And we see that in those that *Stut*, if they drink *Wine* moderately, they *Stut* less, Because it heateth: And so we see, that they that *Stut*, do *Stut* more in the first offer to speak, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Driness* of the *Tongue*, which likewise maketh it less apt to move, as well as *Cold*; For it is an Affect that cometh to some *Wise* and *Great Men*; As it did unto *Moses*, who was *Lingua Prædita*; And many *Stutters* (we find) are very *Cholerick Men*; *Choler* Enducing a *Driness* in the *Tongue*.

Experiment Solitary touching Pestilential Seasons.

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Experiment Solitary touching an Error received about Epidemicall Diseases.

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Experiment Solitary touching the Alteration or Preservation of Liquors in Wells, or deep Vaults.

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Experiment Solitary, touching Stutting.

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Experiments
in Confort,
touching the
Smells.

387

SSmells, and other *Odours*, are Sweeter in the Aire, at some Distance, than near the Nose; As hath been partly touched heretofore. The *Cause* is double: First the finer Mixture, or Incorporation of the *Smell*. For we see that in *Sounds* likewise, they are Sweetest, when we cannot hear every Part by it self. The other *Reason* is, for that all *Sweet Smells* have joynd with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more *Spiritual*, is perceived; And the *Earthy* reacheth not so farre.

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Sweet Smells are most forcible, in *Drie Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Lemons*, the Nipping of their Rinde, giveth out their *Smell* more: And generally, when *Bodies* are *Moved* or *Stirred*, though not *Broken*, they *Smell* more; As a sweet Bagge waved. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when *Way* is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some degree) in the *Moving*: But in this last, there is a *Concurrence* of the *Second Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster upon us.

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The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaves* smell not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pincks*, *Wood-bine*, *Vine-flowers*, *Apple-blooms*, *Lime-Tree blooms*, *Beane-Blooms*, &c. The *Cause* is, for that where there is Heat and strength enough in the *Plant*, to make the *Leaves* *Odorate*, there the *Smell* of the *Flower* is rather *Evanide* and *Weaker*, than that of the *Leaves*; As it is in *Rose-Mary-Flowers*, *Lavender-Flowers*, and *Sweet-Briar-Roses*. But where there is less Heat, there the *Spirit* of the *Plant* is disgetted and refined, and severed from the *Grosser Juyce*, in the *Efflorescence*, and not before.

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Most *Odours* smell best, *Broken* or *Crusht*, as hath been said; But *Flowers* *Presed* or *Beaten*, do leese the *Freshness* and *Sweetness* of their *Odour*. The *Cause* is, for that when they are *Crushed*, the *Grosser* and more *Earthy Spirit* cometh out with the *Finer*, and troubleth it; Whereas in *stronger Odours* there are no such *Degrees* of the *Issue* of the *Smell*.

Experiments
in Confort,
touching the
Goodness and
Choyce of
Water.

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IT is a Thing of very good Use, to Discover the *Goodness* of *Waters*. The *Taste*, to those that Drink *Water* onely, doth somewhat: But other *Experiments* are more sure. First, try *Waters* by *Weight*; Wherein you may find some difference, though not much: And the *Lighter*, you may account the *Better*.

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Secondly, try them by *Boyling* upon an *Equal Fire*: And that which consumeth away fastest, you may account the *Best*.

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Thirdly, try them in *Severall Bottles*, or *Open Vessels*, Matches in every Thing else, and see which of them *Last Longest*, without *Stench*, or *Corruption*: And that which holdeth *Unpurified* longest, you may likewise account the *Best*.

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Fourthly, try them by *Making Drinks*, *Stronger*, or *Smaller*, with the same *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drink*, is the more *Concocted*, and *Nourishing*; though perhaps it be not so good for *Medicinnall use*. And such *Water* (commonly) is the *Water* of *Large* and *Navigable Rivers*: And likewise in *Large* and *Clean Ponds* of *Standing Water*: For upon both them, the *Sunne* hath more power than upon *Fountaines*, or *Small Rivers*. And I conceive that *Chalke-Water* is next them the best, for going furthest in *Drink*: For that also helpeth *Concoction*; So it be out of a *Deep Well*; For then it Cureth
the

the Rawness of the *Water*; But *Chalkie Water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Clothes, which wear out apace, if you use such *Waters*.

Fifthly, the Housewives do find a Difference in *Waters*, for the *Bearing* or *Not Bearing* of *Soap*: And it is likely that the more *Fat Water* will bear *Soap* best; For the *Hungry water* doth kill the Unctuous Nature of the *Soap*.

Sixthly, you may make a Judgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Rain-Water* is, by the *Physicians* esteemed the Finest, and the best; But yet it is said to putrifie sooneit; which is likely, because of the Fineness of the Spirit: And in *Conservatories* of *Rain-water*, (such as they have in *Venice*, &c.) they are found not so Choice *Waters*; The worse, (perhaps) because they are Covered aloft, and kept from the Sunne. *Snow-water* is held unwholsome; Inomuch as the People, that dwell at the Foot of the *Snow-Mountains*, or otherwise upon the Ascent, (especially the Women,) by drinking of *Snow-water*, have great Baggs hanging under their Throats. *Well-water*, except it be upon *Chalk*, or a very plentiful Spring, maketh Meat Red; which is an ill Sign. *Springs* on the *Tops* of *High-Hills* are the best: For both they seem to have a Lightness, and Appetite of Mounting; And besides they are most pure and unmingled: And again, are more Percolated through a great space of Earth. For *Waters* in *Valleys*, joyn in effect under Ground with all *Waters* of the same Levell; Whereas *Springs* on the *Tops* of *Hills*, pass through a great deal of Pure *Earth*, with les Mixture of other *Waters*.

Seventhly, Judgement may be made of *Waters* by the *Soyl* whereupon the *Water* runneth; As *Pebble* is the Cleanest, and best tasted; And next to that *Clay-water*; And Thirdly, *Water* upon *Chalk*; Fourthly, that upon *Sand*; And Worst of all upon *Mudd*. Neither may you trust *Waters* that Taste *Sweet*; For they are commonly found in Rising Grounds of great *Cities*; which must needs take in a great deal of Filth.

IN *Peru*, and divers Parts of the *West-Indies*, though under the *Line*, the *Heats* are not so Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Causes* are, First, the Great *Brizes*, which the Motion of the Air in great Circles, (such as are under the *Girdle* of the *World*,) produceth; Which do refrigerate; And therefore in those Parts Noon is nothing so hot, when the *Brizes* are great, as about Nine or Ten of the Clock in the Fore-Noon. Another *Cause* is, for that the Length of the Night, and the Dews thereof, do compence the *Heat* of the Day. A third *Cause* is the Stay of the Sunne; Not in Respect of Day and Night, (for that we spake of before,) but in Respect of the Season; For under the *Line*, the Sun crosseth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth back again, and so maketh one Long Summer.

THE *Heat* of the *Sunne* maketh *Men Black* in some Countries, as in *Aethiopia*, and *Ginny*, &c. *Fire* doth it not, as we see in *Glass-Men*, that are continually about the *Fire*. The *Reason* may be, because *Fire* doth lick up the *Spirits*, and Bloud of the Body, so as they Exhale; So that it ever maketh *Men* look Pale and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud to the *Outward Parts*, And rather Concocteth it, than Soaketh it: And therefore we see that all

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Experiments
Solitary touch-
ing the
Temperate
Heat under
the *Equino-
ctial*.

398

Experiment
Solitary touch-
ing the Co-
loration of
Black and
Tawney
Moores.

399

Aethiopes are Fleshly, Plump, and have great Lips; All which betoken *Moisture* retained, and not drawn out. We see also, that the *Negroes* are bred in Countries that have plenty of *Water*, by *Rivers*, or otherwise: For *Meroe*, which was the *Metropolis* of *Aethiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of Rivers. And the Confines of the River *Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, insomuch as it is pestilent through Moisture: But the Countries of the *Abyssenes*, and *Barbary*, and *Peru*, where they are Tawney, and Olivaster, and Pale, are generally more Sandy, and Dry. As for the *Aethiopes*, as they are Plump, and Fleshly; So (it may be) they are Sanguine, and ruddy Coloured, if their black Skin would suffer it to be seen.

Experiment
Solitary touch-
ing Motion
after the In-
stant of Death.

400

Some *Creatures* do move a good while after their Head is off, As *Birds*. Some a very little time; As *Men*, and all beasts. Some move, though cut in severall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certain, that the *Immediate Cause* of *Death*, is the *Resolution* or *Extinguishment* of the *Spirits*; And that the *Destruction* or *Corruption* of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the *Extinguishment* of the *Spirits* doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the *Heart* hath been severed; And it is a Report also of Credit, that the *Head* of a *Pig* hath been opened, and the *Brain* put into the *Palm* of a *Mans* hand, trembling, without breaking any part of it, or severing it from the *Marrow* of the *Back-bone*; During which time the *Pig* hath been, in all appearance, stark dead, and without Motion; And after a small Time the *Brain* hath been replaced, and the *Skull* of the *Pig* closed, and the *Pig* hath a little after gone about. And certain it is, that an *Eye* upon *Revenge* hath been thrust forth, so as it hanged a pretty distance by the *Visuall Nerve*; And during that time the *Eye* hath been without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Brain*, which in *Men*, and *Beasts* are Large; And therefore, when the *Head* is off, they move little or nothing. But *Birds* have small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinews*, whereby Motion remaineth in them a little longer; Insomuch as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoot a great Forked Arrow at an *Estrich*, as she ran swiftly upon the Stage, and strook off her Head, And yet she continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all over; And therefore they move in their Severall Pieces.



NATURALL HISTORY.

V. Century.



We will now enquire of *Plants* or *Vegetables*: And we shall doe it with diligence. They are the principall Part of the *Third dayes worke*. They are the first *Producat*, which is the Word of *Animation*; For the other Words are but the Words of *Essence*; And they are of excellent and generall Use, for Food, Medicine, and a Number of Mechanicall Arts.

There were sown in a *Bed*, *Turnip-Seed*, *Raddish-Seed*, *Wheat*, *Cucumber-Seed* and *Pease*. The *Bed* we call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-dung*, old, and well rotted; This was laid upon a Bank, half a foot high, and supported round about with Planks; and upon the Top was cast Sifted Earth, some two Fingers deep; And then the *Seed* sprinkled upon it, having been steeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat*, came up half an Inch above Ground, within two dayes after, without any Watering: The rest the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have been the speedier. This is a Noble *Experiment*; For, without this help, they would have been four times as long in coming up. But there doth not occurre to me, at this present, any use thereof, for profit; Except it should be for Sowing of *Pease*, which have their price very much increased, by the early Coming. It may be tried also with *Cherries*, *Strawberries*, and other Fruit, which are dearest, when they come early.

There was *Wheat*, steeped in *Water* mixed with *Cow-dung*; Others in *Water* mixed with *Horse-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Urine* of *Man*; Other in *Water* mixed with *Chalk* Powdred; Other in *Water* mixed with *Soot*, Other in *Water* mixed with *Ashes*, Other in *Water*

Experiments
in Confort,
touching the
Acceleration
of *Germinari-
on*.

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ter mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit of Wine*. The proportion of the Mixture was, a fourth Part of the Ingredients to the *Water*; Save that there was not of the *Salt* above an eighth Part. The *Vrine*, and *Winds*, and *Spirit of Wine*, were simple without mixture of *Water*. The Time of Steeping was twelve hours. The Time of the Year *October*. There was also other *Wheat* sown *unsteeped*, but *watred* twice a day with *Warm water*. There was also other *Wheat* sown *Simple* to compare it with the rest. The event was; that those that were in the Mixture of *Dung*, and *Vrine*, *Soot*, *Chalk*, *Ashes*, and *Salt*, came up within six dayes: And those that afterwards proved the Highest, Thickest, and most Lustie, were, first the *Vrine*, and then the *Dungs*; Next the *Chalk*; Next the *Soot*; Next the *Ashes*; Next the *Salt*; Next the *Wheat Simple* of it self, *unsteeped*, and *unwatered*; Next the *Watred twice a day* with warme water; Next the *Claret Wine*. So that these three last were flower than the Ordinary *Wheat* of it self; And this Culture did rather retard than advance. As for those that were steeped in *Malmsey*, and *Spirit of Wine*, they came not up at all. This is a Rich *Experiment* for Profit; For the most of the Steepings are Cheap Things; And the goodnes of the Crop is a great Matter of Gain; If the Goodnes of the Crop answer the Earliness of the Coming up: As it is like it will; Both being from the Vigour of the *Seed*; Which also partly appeared in the former *Experiment*, as hath been said. This *Experiment* would be tried in other *Grains*, *Seeds*, and *Kernells*; For it may be some Steeping will agree best with some *Seeds*. It would be tried also with *Roots* steeped as before, but for *longer time*. It would be tried also in *Severall Seasons* of the Year, especially in the *Spring*.

403 *Strawberries* watered now and then, (as once in three dayes,) with *Water*, wherein hath been steeped *Sheepes-dung*, or *Pigeons-dung*, will prevent and come early. And it is like the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Grains* or *Trees*. And therefore it is an *Experiment*, though vulgar in *Strawberries*, yet not brought into use generally: For it is usuall to help the Ground with Muck; And likewise to Recomfort it sometimes with Muck put to the *Roots*; But to water it with *Muck water*, which is like to be more Forcible, is not practised.

404 *Dung*, or *Chalk*, or *Bloud*, applied in Substance, (seasonably,) to the *Roots* of *Trees*, doth set them forwards. But to do it unto *Herbs*, without Mixture of *Water* or *Earth*, it may be these helps are too Hot.

405 The former Means of helping *Germination*, are either by the *Goodnes*, and *Strength* of the *Nourishment*; Or by the *Comforting* and *Exciting* the *Spirits* in the *Plant*, to draw the *Nourishment* better. And of this latter kind, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the experiments that follow; Though they be not Applications to the *Root*, or *Seed*. The *Planting* of *Trees* warm upon a *Wall*, against the South, or South-East Sunne, doth hasten their Coming on, and Ripening; And the South-East is found to be better than the South-West, though the South-West be the Hotter Coast. But the cause is cheifly, for that the Heat of the Morning succeedeth the Cold of the Night: and partly, because, (many times) the South-West Sunne is too parching. So likewise *Planting* of them upon the *Back* of a *Chimney* where a *Fire* is kept, doth hasten their Coming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Room*, where a *Fire* is continually kept, worketh the same Effect; which hath been tried with *Grapes*; Inasmuch as they will come a *Moneth* earlier, then the *Grapes* abroad.

Besides the two *Meanes of Accelerating Germination*, formerly described; That is to say, the *Mending of the Nourishment*; *Comforting of the Spirit of the Plant*; there is a Third; Which is the *Making Way for the Easie Coming to the Nourishment*, and *Drawing it*. And therefore *Gentle Digging and Loosening of the Earth about the Roots of Trees*; And the *Removing Herbs and Flowers* into new Earth, once in two yeares, (which is the same thing; For the new Earth is ever looser, (doth greatly further the *Prospering*, and *Earliness of Plants*.)

406

But the most admirable *Acceleration by Facilitating the Nourishment*, is that of *Water*. For a *Standard of a Damask Rose* with the *Root* on, was set in a Chamber, where no Fire was, upright in an *Earthen Pan*, full of *Fair Water*, without any Mixture, half a foot under the *Water*, the *Standard* being more than two Foot high above the *Water*: Within in the Space of ten dayes, the *Standard* did put forth a fair *Green leaf*, and some other little *Buds*, which stood at a stay, without any Shew of decay or withering, more then seven Dayes. But afterwards that *Leaf* faded, but the young *Buds* did sprout on; which afterward opened into fair *Leaves*, in the space of three Moneths; And continued so a while after, till upon Removall we left the *Triall*. But note that the *Leaves* were somewhat paler, and lighter-coloured, then the *Leaves* use to be abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had been in the *Spring* time, it would have put forth with greater strength, and (it may be) to have grown on to bear *Flowers*. By this *Meanes*, you may have, (as it seemeth,) *Roses* set in the midst of a *Pool*, being supported with some stay; Which is Matter of *Rareness and Pleasure*, though of small Use. This is the more strange for that the like *Rose-Standard* was put, at the same time, into *Water* mixed with *Horse-dung*, the *Horse-dung* about the fourth Part to the *Water*, and in four Moneths ipace (while it was observed) put not forth any *Leaf*, though divers *Buds* at the first, as the other.

407

A *Dutch Flower*, that had a *Bulbous Root*, was likewise put, at the same time, all under *Water*, some two or three Fingers deep; And within seven dayes sprouted, and continued long after, further Growing. There were also put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddish-Root*, which had all their *Leaves* cut almost close to the *Roots*; And within six weeks had fair *Leaves*; And so continued, till the end of *November*.

408

Note that if *Roots*, or *Pease*, or *Flowers* may be *Accelerated* in their *Coming and Ripening*, there is a double Profit; The one in the high *Price* that those Things beare when they come early: The other in the *Swiftness* of their *Returnes*: For in some Grounds which are strong, you shall have a *Raddish*, &c. come in a Moneth; That in other Grounds will not come in two; And so make double *Returnes*.

406

Wheat also was put into the *Water*, and came not forth at all; So as it seemeth there must be some Strength and Bulk in the Body, put into the *Water*, as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But casually some *Wheat* lay under the Pan, which was somewhat moistened by the Suing of the Pan; which in six weeks (as aforesaid) looked mouldy to the Eye, but it was sprouted forth half a Fingers length.

410

It seemeth by these *Instances of Water*, that for *Nourishment*, the *Water* is almost all in all, and that the *Earth* doth but keep the *Plant* upright, and save it from *Over-heat*, and *Over-cold*; And therefore is a *Comfortable Experiment* for good *Drinkers*. It proveth also that our former *Opinion*: That *Drink*

411

Drink incorporate with Flesh; or Roots, (as in *Capon-Beer*, &c.) will nourish more easily, than Meat and Drink taken severally.

412

The *Housing* of *Plants* (I conceive) will both *Accelerate Germination*, and bring forth *Flowers*, and *Plants* in the *Colder Seasons*: And as we *House* *Hot* *Country Plants*, as *Lemons*, *Orenges*, *Myrtles*, to save them; So we may *House* our own *Country Plants*, to forward them, and make them come in the *Cold* *Seasons*; In such sort, that you may have *Violets*, *Strawberries*, *Pease*, all *Winter*: So that you sow, or remove them at fit times. This *Experiment* is to be referred unto the *Comforting* of the *spirit* of the *Plant*, by *Warmth*, as well as *Housing* their *Boughs*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in General three.

Experiments
in Consort,
touching the
Putting back
or Retardation
of Germination

413

TO make *Roses*, or other *Flowers* come late, it is an *Experiment* of *Pleasure*. For the *Ancients* esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, having been less exhiled by the *Sun*. The *Meanes* are these. First, the *Cutting off their Tops*, immediately after they have done *Bearing*; And then they will come again the same year about *November*: But they will not come just on the *Tops*, where they were cut, but out of those *Shoots* which were (as it were,) *Water-Boughs*. The *Cause* is, for that the *Sap*, which otherwife would have fed the *Top*, (though after *Bearing*,) will, by the discharge of that, divert unto the *Side-Sprouts*; And they will come to bear, but later.

414

The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted*; For then the *Side-Branches* will bear. The *Cause* is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, work the same Effect; in Retention of the *Sap* for a time, and *Diversification* of it to the *Sprouts*, that were not so forward.

415

The Third is the *Cutting off some few of the Top-Boughes* in the *Spring-time*, but suffering the lower *Boughes* to grow on. The *Cause* is, for that the *Boughes* do help to draw up the *Sap* more strongly: And we see that in *Powling* of *Trees*, many do use to leave a *Bough* or two on the *Top*, to help to draw up the *Sap*. And it is reported also, that if you graft upon the *Bough* of a *Tree*, and cut off some of the old *Boughes*, the new *Cions* will perish.

416

The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plain, for that it doth arrest the *Sap*, from going upwards, for a time; Which Arrest, is afterwards released by the *Covering* of the *Root* again with *Earth*; And then the *Sap* getteth up, but later.

417

The Fifth is the *Removing of the Tree*, some Moneth before it *Buddeth*. The *Cause* is, for that some time will be required after the *Remove*, for the *Resetling*, before it can draw the *Juyce*; And that time being lost, the *Blossom* must needs come forth later.

418

The Sixth is the *Grafting of Roses in May*, which commonly *Gardiners* do not till *July*; And then they bear not till the *Next Year*; But if you graft them in *May*, they will bear the same year, but late.

419

The Seventh is the *Girding of the Body of the Tree* about with some *Pack-thread*; For that also in a degree, restraineth the *Sap*, and maketh it come up more late, and more Slowly.

420

The Eighth is the *Planting of them in a Shade*, or in a *Hedge*. The *Cause* is, partly the *Keeping out of the Sunne*, which hasteneth the *Sap* to rise; And partly the *Robbing* of them of *Nourishment*, by the *Stuff* in the *Hedge*. These meanes may be practised upon other, both *Trees*, and *Flowers*,

Mutatis Mutandis.

Men

Men have entertained a Conceit that sheweth prettily ; Namely, that if you graft a *Late-Coming-Fruit*, upon a Stock of a *Fruit-Tree* that *Cometh early*, the Graft will bear *Fruit Early* ; As a Peach upon a Cherry, And contrariwise, if an *Early-Coming-Fruit* upon a Stock of a *Fruit-Tree* that *Cometh late*, the Graft will bear *Fruit late* ; As a Cherry upon a Peach, But these are but Imaginations, and untrue. The *Cause* is, for that the Cions over-ruleth the Stock quite ; And the Stock is but Passive only, and giveth Aliment, but no Motion to the Graft.

421

We will speak now, how to make *Fruits, Flowers, and Roots* larger, in more plenty and sweeter than they use to be; And how to make the *Trees* themselves, more Tall ; more Spread, and more Hasty and Sudden, than they use to be. Wherein there is no doubt, but the former *Experiments of Acceleration*, will serve much to these Purposes. And again that these *Experiments*, which we shall now set down, do serve also for *Acceleration* ; because both Effects proceed from the Increase of vigour in the Tree ; But yet to avoid Confusion. And because some of the Meanes are more proper for the one Effect, and some for the other, we will handle them apart.

Experiments in Confort, touching the Melioration of Fruit, Trees, and Plants.

It is an assured Experience, that an *Heap of Flint or Stone*, laid, about the Bottom of a *Wild-Tree*, (as in Oak, Elm, Ash, &c.) upon the first Planting, doth make it prosper double as much as without it. The *Cause* is, for that it retaineth the Moisture, which falleth at any time upon the *Tree*, and suffereth it not to be exhaled by the Sunne. Again, it keepeth the Tree warm, from Cold Blasts and Frosts, as it were in an House. It may be also, there is somewhat in the Keeping of it steady at the first. *Quare*, if Laying of Straw some Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giveth the Sap, yet it is the Body that draweth it. But you must note, that if you lay *Stones* about the stalk of Lettuce, or other Plants, that are more soft, it will over-Moisten the Roots, so as the Worms will eat them.

422

A *Tree*, at the first *Setting*, should not be *Shaken*, until it hath taken *Root fully*: And therefore some have put two little Forks about the Bottom of their *Trees*, to keep them upright ; But after a years Rooting, then Shaking doth the *Tree* good, by Loosening of the Earth, and (perhaps) by Exercising (as it were) and Stirring the Sap of the *Tree*.

423

Generally, the *Cutting away of Boughs and Suckers* at the *Root and Body*, doth make *Trees* grow high ; And contrariwise, the *Powling and Cutting* of the Top, maketh them grow spread and bushy. As we see in *Pollards, &c.*

424

It is reported, that to make *hasty Growing Coppice-Wood*, the way is, to take *Willow, Sallow, Poplar, Alder*, of some seven years growth ; And to set them, not upright, but a-slope, a reasonable depth under the Ground ; And then, in stead of one Root, they will put forth many, and so carry more Shoots upon a Stem.

425

When you would have *many new Roots* of *Fruit-Trees*, take a *Low Tree*, and bow it, and lay all his branches a-flat upon the Ground, and cast Earth upon them ; And every *Twig* will take *Root*. And this is very profitable

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ble Experiment for Costly Trees; (for the Boughes will make Stocks without charge;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.* The like is continually practised with *Vines, Roses, Musk-Roses, &c.*

427 From *May* to *July* you may take off the *Bark* of any *Bough*, being of the Bigness of three or four Inches, and cover the bare Place, somewhat above, and below, with Loame well tempered with Horfe-dung, binding it fast down. Then cut off the Bough about *Albollantide* in the bare Place, and set it in Ground; And it will grow to be a fair *Tree* in one Year. The Cause may be, for that the *Baring* from the *Bark* keepeth the *Sap* from descending towards Winter, and so holdeth it in the Bough; And it may be also that Loam and Horfe-dung applyed to the bare place, do moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the *Sap* of *Trees* in their Boughes; Which may serve to other Effects.

428 It hath been practised in *Trees*, that shew fair, and bear not, to Bore a Hole thorow the *Heart* of the *Tree*, and thereupon it will bear. Which may be, for that the *Tree* before had too much *Repletion*, and was oppressed with his own *Sap*; For *Repletion* is an *Enemie* to *Generation*.

429 It hath been practised in *Trees*, that do not bear, to cleave two or three of the Chief Roots, and to put into the Cleft a small Pebble, which may keep it open, and then it will bear. The Cause may be, for that a Root of a *Tree* may be (as it were,) Hide-bound, no lets then the Body of the *Tree*; but it will not keep open without somewhat put into it.

430 It is usually practised, to set *Trees* that require much *Sun*, upon walls against the *South*. As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double *Commoditie*; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the upper Boughes over-shadow the lower: But when it is spread upon a *Wall*, the *Sunne* cometh alike, upon the upper, and lower Branches.

431 It hath also been practised, (by some) to pull some *Leaves* from the *Trees* so spread, that the *Sunne* may come upon the *Bough* and *Fruit* the better. There hath been practised also a *Curiositie*, to set a *Tree* upon the *North-Side* of a *Wall*, and at a little height, to draw him through the *Wall*, and spread him upon the *South-Side*: Conceiving that the *Root* and lower Part of the *Stock* should enjoy the *Freshness* of the *Shade*; And the Upper Boughs, and *Fruit*, the *Comfort* of the *Sunne*. But it sorted not; The Cause is, for that the *Root* requireth some *Comfort* from the *Sunne*, though under *Earth*, as well as the *Bodie*; And the Lower Part of the *Bodie* more than the Upper, as we see in *Compassing* a *Tree* below with straw.

432 The *Lowness* of the *Bough*, where the *Fruit* cometh, maketh the *Fruit* greater, and to ripen better; For you shall ever see in *Apricots, Peaches*, or *Melo-Cotones*, upon a wall, the greatest *Fruits* towards the *Bottom*. And in *France* the *Grapes* that make the *Wine*, grow upon the low *Vines*, bound to small *Stakes*. And the raised *Vines* in *Arbours* make but *Verjuice*. It is true, that in *Italy*, and other *Countries*, where they have hotter *Sunne*, they raise them upon *Elmes*, and *Trees*; But I conceive, that if the *French* Manner of *Planting* low, were brought in use, their *Wines* would be stronger and sweeter. But it is more chargeable in respect of the *Props*. It were good to try whether a *Tree* grafted somewhat near the *Ground*, and the lower boughs only maintained, and the higher continually pruned off, would not make a larger *Fruit*.

To have *Fruit* in *Greater Plentie*, the way is, to graft, not only upon young *Stocks*, but upon divers *Boughes* of an old *Tree*; for they will bear great Numbers of *Fruit*; Whereas if you graft but upon one *Stock*, the *Tree* can bear but few. 433

The *Digging* yearly about the *Roots* of *Trees*, which is a great meanes, both to the *Acceleration* and *Melioration* of *Fruits*, is practised in nothing but in *Vines*; Which if it were transferred unto other *Trees*, and *Shrubs* (as *Roses*, &c.) I conceive would advance them likewise. 434

It hath been known, that a *Fruit-Tree* hath been blown up (almost) by the *Roots*, and set up again, and the next year bare exceedingly. The *Cause* of this, was nothing but the *Loosening* of the *Earth*, which comforteth any *Tree*, and is fit to be practised, more than it is, in *Fruit-Trees*: For *Trees* cannot be so fitly removed into *New Grounds*, as *Flowers* and *Herbs* may. 435

To revive an *Old Tree*, the *Digging* of it about the *Roots*, and Applying new Mould to the *Roots*, is the Way. We see also that *Draught-Oxen*, put into fresh Pasture, gather new and tender *Flesh*; And in all Things, better Nourishment than hath been used, doth help to renew; Especially, if it be not onely better, but changed, and differing from the former. 436

If an *Herb* be cut off from the *Roots*, in the beginning of *Winter*, and then the *Earth* be trodden and beaten down hard, with the *Foot* and *Spade*, the *Roots* will become of very great Magnitude in *Summer*. The Reason is, for that the *Moisture* being forbidden to come up in the *Plant*, stayeth longer in the *Root*, and so dilateth it. And *Gardeners* use to tread down any loose *Ground*, after they have sown *Onions*, or *Turnips*, &c. 437

If *Panicum* be laid below, and about the Bottom of a *Root*, it will cause the *Root* to grow to an Excessive Bigness. The *Cause* is, for that being it self of a *Spongy Substance*, it draweth the *Moisture* of the *Earth* to it, and so feedeth the *Root*. This is of greatest use for *Onions*, *Turnips*, *Parfnips*, and *Carrets*. 438

The *Shifting* of *Ground* is a Meanes to better the *Tree*, and *Fruit*; But with this Caution; That all Things do prosper best, when they are advanced to the better: Your *Nurserie* of *Stocks* ought to be in a more *Barren Ground*, than the *Ground* is whereunto you remove them. So all *Grafiers* preferre their *Cattell* from meaner Pastures to better. We see also, that *Hardness* in *Youth* lengthneth *Life*, because it leaveth a *Cherishing* to the better, of the *Body*, in *Age*: Nay in *Exercises*, it is good to begin with the hardest, as *Dancing* in *Thick Shooes*, &c. 439

It hath been observed, that *Hacking* of *Trees* in their *Barke*, both down-right, and acrofs, so as you make them rather in *slices*, than in continued *Hacks*, doth great good to *Trees*, And especially delivereth them from being *Hide-bound*, and killeth their *Moss*. 440

Shade to some *Plants* conduceth to make them large and prosperous, more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borage-Seed*; And you shall find the *Strawberries* under those *Leaves* farre more large than their *Fellowes*. And *Bayes* you must plant to the *North*; Or descend them from the *Sunne* by a *Hedge-Row*; And when you sow the *Berries*, weed not the *Borders*, for the first half year; For the *Weed* giveth them *Shade*. 441

To increase the *Crops* of *Plants*, there would be considered, not onely the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the *Saving* also of that which is *spilt*. So they have lately made a *Triall*, to *Set Wheat*; which nevertheless 442

vertheless hath been left off, because of the trouble and paines; Yet so much is true, that there is much saved by the *Setting*, in comparison of that which is *Sown*; Both by keeping it from being picked up by Birds; And by Avoiding the Shallow lying of it, whereby much that is sown taketh no Root.

443 It is prescribed by some of the *Ancients*, that you take *Small Trees*, upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the Middle of *Autumn* with dung, untill the Spring; And then take them up in a warm day, and replant them in good Ground; And by that meanes, the former years *Tree* will be ripe, as by a new Birth; when other *Trees* of the same kind, do but blossom. But this seemeth to have no great Probabilitie.

444 It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thickness of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will sprout forth within eight dayes. The *Cause* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*.

445 Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Oranges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*), and they will come up much earlier than in the *Earth* it self. This I conceive to be as a Kind of *Grafting* in the *Root*; For as the Stock of a Graft yeeldeth better prepared Nourishment to the Graft, than the Crude Earth; So the *Squill* doth the like to the *Seed*; And I suppose the same would be done, by *Putting Kernells* into a *Turnip*, or the like; Save that the *Squill* is more Vigorous, and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in severall places, when it is almost at his Bigness, and before it ripeneth, hath been practised with success, to ripen the *Fruit* more suddenly. We see the Example of the *Biting* of *Wasps*, or *Wormes*, upon *Fruit*, whereby it (manifestly) ripeneth the sooner.

447 It is reported, that *Alga Marina* (*Sea-Weed*) put under the *Roots* of *Colworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Help to Fertilitye.

448 It hath been practised, to cut off the *Stalks* of *Cucumbers*, immediately after their *Bearing*, close by the *Earth*; And then to cast a pretty Quantity of *Earth* upon the *Plant* that remaineth, and they will bear the next year *Fruit*, long before the ordinary time. The *Cause* may be, for that the Sap goeth down the sooner, and is not spent in the *Stalk* or *Leaf*, which remaineth after the *Fruit*. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annually*, seemeth to be partly caused by the Over-Expende of the Sap into *Stalk*, and *Leaves*; which being prevented, they will super-annuate, if they stand warm.

449 The *Pulling off* many of the *Blossoms* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cause* is manifest; For that the Sap hath the less to nourish. And it is a Common Experience, that if you do not pull off some *Blossoms*, the first time a *Tree* bloometh, it will blossom it self to death.

450 It were good to trie, what would be the Effect, if all the *Blossoms* were pulled from a *Fruit-Tree*; Or the *Acornes*, and *Chestnut-buds*, &c. from a *Wild Tree*, for two years together. I suppose that the *Tree* will either put forth, the third year, bigger, and more plentifull *Fruit*; Or else, the same years, larger *Leaves*, because of the Sap stored up.

It hath been generally received, that a *Plant watered* with *Warm Water*, will come up sooner and better, than with *Cold Water*, or with *Showers*. But our *Experiment of Watering Wheat* with *Warm Water* (as hath been said) succeeded not; which may be, because the *Triall* was too late in the *Year*, viz. in the end of *October*. For the *Cold* then coming upon the *Seed*, after it was made more tender by the *Warm Water*, might check it. 451

There is no doubt, but that *Grafting* (for the most Part) doth *meliorate* the *Fruit*. The *Cause* is manifest; For that the *Nourishment* is better prepared in the *Stock*, than in the *Crude Earth*: But yet note well, that there be some *Trees*, that are said to come up more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cause* I suppose to be, for that those *Plants* require a *Nourishment* of great *Moisture*; And though the *Nourishment* of the *Stock* be finer, and better prepared, yet it is not so moist, and plentifull, as the *Nourishment* of the *Earth*. And indeed we see those *Fruits* are very *Cold Fruits* in their *Nature*. 452

It hath been received, that a *Smaller Pear*, grafted upon a *Stock* that beareth a *Greater Pear*, will become *Great*. But I think it is as true, as that of the *Prime-Fruit* upon the *Late Stock*; And *é controverso*, Which we rejected before: For the *Cions* will govern. Nevertheless it is probable enough, that if you can get a *Cions* to grow upon a *Stock* of another kind, that is much moister than his own *Stock*, it may make the *Fruit* Greater, because it will yeeld more plentifull *Nourishment*; Though it is like it will make the *Fruit* *Baser*. But generally the *Grafting* is upon a *drier Stock*; As the *Apple* upon a *Crab*; The *Pear* upon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* upon the *Stock* of a *Colewort*, and it will bear a great *flaggy Apple*; The *Kernell* of which, if it be set, will be a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cions* will prosper, if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elm*, or upon an *Horse-Plum*, which are the moistest of *Trees*. I have heard that it hath been tried upon an *Elm*, and succeeded. 453

It is manifest by *Experience*, that *Flowers* Removed wax greater, because the *Nourishment* is more easily come by, in the loose *Earth*. It may be, that *Of Regrafting* of the same *Cions*, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it upon a *Stock* the first year; And then cut it off, and graft it upon another *Stock* the second year; And so for a third; Or fourth year; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*. 454

Of Grafting there are many Experiments worth the Noting, but those we reserve to a proper Place.

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth *Leaves*, have his *Top* cut off. The *Cause* is plain, for that the *Sap* hath the less to feed, and the less way to mount: But it may be the *Fig* will come somewhat later, as was formerly touched. The same may be tried likewise in other *Trees*. 455

It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Trunk* of the *Tree* thorow; in severall places, and thrust into the *Places* bored, *Wedges* of some *Hot Trees*; as *Turpentine*, *Mastick-Tree*, *Guaicum*, *Juniper*, &c. The *Cause* may be, for that *Adventive Heat* doth chear up the *Native Juice* of the *Tree*. 456

It is reported, that *Trees* will grow greater, and bear better *Fruit*, if you put *Salt*, or *Lees of Wine*, or *Blond* to the *Root*. The *Cause* may be the *Encreasing* 457

creasing the Lust or Spirit of the *Root* ; These Things being more forcible, than ordinary *Composts*.

458 It is reported by one of the Ancients, that *Artichoakes* will be less prickly, and more tender, if the *Seeds* have their *Tops* dulled, or grated off upon a *Stone*.

459 *Herbs* will be tenderer, and fairer, if you take them out of *Beds*, when they are newly come up, and remove them into *Pots*, with better *Earth*. The Remove from *Bed* to *Bed* was spoken of before; But that was in severall yeares; This is upon the sudden. The *Cause* is the same with other *Removes*, formerly mentioned.

460 *Coleworts* are reported by one of the Ancients, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt-water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is less Adurent than *Salt*.

461 It is reported, that *Cucumbers* will prove more Tender and Dainty, if their *Seeds* be Steeped (little) in *Milk*; The *Cause* may be, for that the *Seed* being mollified with the *Milk*, will be too weak to draw the grosser Juyce of the *Earth*, but only the finer. The same *Experiment* may be made in *Artichoakes*; and other *Seeds*, when you would take away, either their *Flashiness*, or *Bitterness*. They speak also, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too Quick a Spirit.

462 It is reported, that *Cucumbers* will be less Watry, and more *Melon-like*, if in the *Pit* where you set them, you fill it (half way up) with *Chaff*, or small *Sticks*, and then powr *Earth* upon them; For *Cucumbers*, as it seemeth, do extremely affect *Moisture*; And over-drink themselves; Which this *Chaff*, or *Chips* forbiddeth. Nay, it is further reported, that if when a *Cucumber* is grown, you set a *Pot* of water about five or six Inches distance from it, it will, in 24. houres, shoot so much out, as to touch the *Pot*: Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it discovereth *Perception* in *Plants*, to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is far more strange: It is, that if you set a *Stake*, or *Prop*, some distance from it, it will grow that way; Which is far stranger (as is said) than the other: For that *Water* may work by a *Sympathy* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

463 It hath been touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receive *Aliment* sufficient; And yet no more than they can well turn, and digest; And withall do sweat out the coursest and unprofitablest Juyce; Even as it is in *Living Creatures*; which by Moderate Feeding, and Exercise, and Sweat, attain the soundest Habit of Body.

464 As *Terebration* doth *Meliorate Fruit*, so, upon the like reason, doth *Letting*, of *Plants*, *Bloud*; As *Pricking Vines*, or other *Trees*, after they be of some Growth; And thereby letting forth *Gumme*, or *Tears*; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* have been turned into *Sweet*.

465 The Ancients for the *Dulcorating* of *Fruit*, do commend *Swines-Dung* above all other *Dung*, Which may be, because of the *Moisture* of that Beast, whereby the *Excrement* hath less *Acrimony*, For we see *Swines* and *Pigs* *Flesh* is the *Moistest* of *Fleshes*.

It is observed by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be grown up some reasonable time, they be cut, and so you take the latter Sprout. The *Cause* may be for that the longer the Juice stayeth in the Root, and Stalk, the better it concocteth. For one of the Chief Causes, why *Grains*, *Seeds*, and *Fruits*, are more Nourishing than *Leaves*, is the length of time, in which they grow to *Maturation*. It were not amiss to keep back the Sap of *Herbs*, or the like, by some fit means, till the end of Summer; whereby (it may be) they will be more Nourishing.

466

As *Grafting* doth generally advance and *Meliorate Fruits*; above that which they would be, if they were set of *Kernels*, or *Stones*, in regard the *Nourishment* is better concocted, So (no doubt) even in *Grafting*, for the same cause, the Choice of the *Stock* doth much; Always provided; that it be somewhat inferiour to the *Cions*. For otherwise it dullereth it. They commend much the *Grafting* of *Peares*, or *Apples*, upon a *Quince*.

467

Besides the *Means* of *Melioration* of *Fruits*, before mentioned, it is set down as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaff* and *Swines-Dung*; (especially laid up together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*.

468

It is delivered, that *Onions* wax greater, if they be taken out of the Earth, and laid drying twenty dayes, and then set again; And yet more, if the outermost Pill be taken off all over.

469

It is delivered by some, that if one take the *Bough* of a *Low-Fruit-Tree*, newly budded, and draw it gently, without hurting it, into an *Earthern Pot* perforate at the bottom to let in the *Plant*, and then cover the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Planting* of *Plants*; without Removing, and Leaving the *Fruit* in the Earth. The like, they say, will be effected, by an *Empty Pot* without Earth in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if some few *Pertusions* be made in the *Pot*. Wherein, besides the *Defending* of the *Fruit*, from *Extremity* of *Sunne* or *Weather*, some give a reason, that the *Fruit*, Loving and Coveting the open Aire and Sun, is invited by those *Pertusions*, to spread and approach, as near the open Air, as it can; and so enlargeth in *Magnitude*.

470

All *Trees*, in *High* and *Sandy Grounds*, are to be set deep; And in *Watry Grounds*, more shallow. And in all *Trees*, when they be removed (especially *Fruit-Trees*) care ought to be taken, that the *Sides* of the *Trees* be coasted, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that seemeth to have less reason; Because the *Stone* lyeth not so near the *Sunne*, as the *Tree* groweth.

471

Timber Trees in a *Coppice Wood*, do grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot up still in Height; And chiefly because they are defended from too much *Sunne* and *Wind*, which do check the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set upon a *Wall*, against the *Sunne*, between *Elbowes* or *Buttresses* of *Stone*, ripen more, than upon a *Plain Wall*.

472

It is said, that if *Potato Roots*, be set in a *Pot* filled with Earth, and then the *Pot* with Earth be set likewise within the Ground, some two or three Inches, the *Roots* will grow greater, than Ordinary. The *Cause* may be, for that Having Earth enough within the *Pot* to nourish them; And then being stopped by the *Bottom* of the *Pot* from putting *Strings* downward, they must needs grow greater in *Breadth*, and *Thickness*. And it may be,

473

that all *Seeds*, *Roots*, *Potted*, and so set into the *Earths*, will prosper the better.

474 The *Cutting off* the *Leaves* of *Radish*, or other *Roots*, in the beginning of *Winter*, before they wither; And *Covering* again the *Root*, something high with *Earth*, will preserve the *Root* all *Winter*, and make it bigger, in the *Spring* following, as hath been partly touched before. So that there is a double Use of this *Cutting off* the *Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater; And so it will do to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by strengthening the *Root*, it will make the *Fruit* also the greater.

475 It is an *Experiment* of great pleasure, to make the *Leaves* of *Shady Trees*, larger than ordinary. It hath been tryed (for certain) that a *Cions* of a *Weech-Elm*, grafted upon the *Stock* of an Ordinary *Elm*, will put forth *Leaves*, almost as broad as the *Brim* of ones *Hat*. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that bear no *Fruit*, it will make the greater *Leaves*. It would be tryed therefore in *Trees* of that kind chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Tail*, because of the pleasure of the *Leaf*.

476 The *Barrenness* of *Trees* by *Accident*, (besides the *Weakness* of the *Soil*, *Seed*, or *Root*, and the *Injury* of the *Weather*) coming either of their *Overgrowing* with *Moss*; Or their being *Hide-bound*; Or their *Planting* too deep; Or by *Issuing* of the *Sap* too much into the *Leaves*: For all these three are *Remedies* mentioned before.

Experiments
in Consort,
touching
Compound
Fruits and
Flowers.

We see that in *Living Creatures*, that have *Male* and *Female*, there is *Copulation* of severall *Kinds*, and so *Compound Creatures*: As the *Mule*, that is generated betwixt the *Horse* and *Ass*: And some other *Compounds*, which we call *Monsters*, though more rare: And it is held that that *Proverb*, *Africa semper aliquid Monstri parit*, cometh, for that the *Fountains* of *Waters* there, being rare, divers *Sorts* of *Beasts* come from severall *Parts* to drink: And so being refreshed, fall to couple, and many times with severall *Kinds*. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; which nevertheless, if it be possible, is more at command than that of *Living Creatures*; For that their *Lust* requireth a voluntary *Motion*; wherefore i were One of the most *Notable Experiments* touching *Plants*, to find it out; For so you may have great *Variety* of *New-Fruits*, and *Flowers* yet unknown. *Grafting* doth it not; That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the *Power* to make a *New Kind*. For the *Cions* ever over-ruleth the *Stock*.

477

It hath been set down by one of the *Ancient*, that if you take two *Twigs* of severall *Fruit-Trees*, and flat them on the *Sides*, and then bind them close together, and set them in the *ground*, they will come up in one *Stock*; But yet they will put forth in their severall *Fruits* without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Unity* of *Continuance*, is easier to procure,

procure, than *Unity of Species*. It is reported also that *Vines of Red and White Grapes*, being set in the Ground, and the upper Parts being flatted, and bound close together, will put forth *Grapes of the severall Colours*, upon the same Branch; and *Grape-Stones of severall Colours* within the same *Grape*: But the more, after a year or two; the *Unity* (as it seemeth) growing more Perfect. And this will likewise help, if from the first *Vniting*, they be often Watred; For all Moisture helpeth to *Union*. And it is prescribed also, to binde the *Bud*, as soon as it cometh forth, as well as the *Stock*; at the least for a time.

They report, that divers *Seeds* put into a *Clout*, and laid in Earth well dunged, will put up *Plants Contiguous*; Which (afterwards) being bound in; their *Shoots* will *Incorporate*. The like is said of *Kernels* put into a *Bottle* with a *Narrow Mouth*, filled with Earth.

It is reported, that young *Trees of severall kindes*, set contiguous without any binding, and very often Watred, in a *Fruitfull Ground*, with the very luxury of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Means, that hath been propounded; for that the *Binding* doth hinder the *Naturall Swelling* of the *Tree*, which, while it is in Motion, doth better *Unite*.

There are many *Ancient and Received Traditions and Observations*, touching the *Sympathy and Antipathy of Plants*; For that some will thrive best growing near others; which they impute to *Sympathy*: And some worse; which they impute to *Antipathy*. But these are *Idle and Ignorant Conceits*; and forsake the true *Indication of the Causes*; as the most part of *Experiments*, that concern *Sympathies and Antipathies do*. For as to *Plants*, neither is there any such *Secret Friendship, or Hatred*, as they imagin. And if we should be content to call it *Sympathy and Antipathy*, it is utterly mistaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Wheresoever one *Plant* draweth such a particular *Juyce* out of the Earth, as it qualifyeth the Earth; so as that *Juyce* which remaineth is fit for the other *Plant*, there the *Neighbourhood* doth good; because the *Nourishments* are contrary, or severall: But where two *Plants* draw (much) the same *Juyce*, there the *Neighbourhood* hurteth; For the one deceiveth the other

First, therefore, all *Plants* that do draw much *Nourishment* from the Earth and so soak the Earth, and exhaust it, hurt all things that grow by them; As great *Trees*, (especially *Ashes*;) and such *Trees*, as spread their *Roots*, near the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* onely; But it is an Enemy to any other *Plant*; Because it draweth strongly the fattest *Juyce* of the Earth. And if it be true, that the *Vine*, when it creepeth near the *Colewort*, will turn away; This may be, because there it findeth worse *Nourishment*; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth.

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Experiments
in Consort,
touching the
Sympathy and
Antipathy of
Plants.

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Where *Plants* are of severall Natures, and draw severall Juyces out of the Earth, there (as hath been said) the One set by the other helpeth: As it is set down by divers of the Ancients, that *Rew* doth prosper much, and becometh stronger, if it be set by a *Figge-Tree*: Which (we conceive) is caused, not by reason of *Friendship*, but by *Extraction* of contrary Juyces: The one Drawing *Juyce* fit to reult Sweet, the other Bitter. So they have set down likewise, that a *Rose* set by *Garlick* is sweeter: Which likewise may be, because the more Fetide Juyce of the Earth goeth into the *Garlick*, and the more Odorate into the *Rose*.

482

This we see manifestly, that there be certain *Corn-Flowers*, which come seldome or never in other places, unless they be set, but onely amongst *Corne*: As the *Blew-Bottle*, a kinde of *Tellow Mary-gold*, *Wilde Poppy*, and *Fumitory*. Neither can this be, by reason of the Culture of the Ground, by Plowing or Furrowing, as some *Herbs* and *Flowers* will grow but in *Ditches* new Cast, for if the ground lie fallow and unfown, they will not come: So as it should seem to be the *Corn*, that qualifieth the Earth, and prepareth it for their Growth.

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This Observation, if it holdeth, (as it is very probable,) is of great use, for the *Meliorating* of *Tast* in *Fruits*, and *Esculent Herbs*; And of the *Sent* of *Flowers*. For I do not doubt, but if the *Figge-Tree* do make the *Rew* more strong, and bitter, (as the Ancients have noted,) good store of *Rew* planted about the *Figge-Tree*, will make the *Figge* more sweet. Now the *Tasts* that do most offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*, *Harsh*, *Sawre*, and *Watrish*, or *Flashy*. It were good therefore to make the *Trials* following.

484

Take *Wormwood*, or *Rew*, and set it near *Lettuce*, or *Coleflory*, or *Artichok*; And see whether the *Lettuce*, or the *Coleflorie*, &c. become not the sweeter.

485

Take a *Service-Tree*, or a *Cornelian-Tree*, or an *Elder Tree*, which we know have *Fruits* of harsh and binding Juyce, and set them near a *Vine*, or *Fig-Tree*, and see whether the *Grapes* or *Figs*, will not be the sweeter.

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Take *Cucumbers*, or *Pumpions*, and set them (here and there) amongst *Musk-Melons*, and see whether the *Melons* will not be more *Winy*, and better tasted. Set *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish*, will not be made the more Biting.

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Take *Sorrell*, and set it amongst *Rasps*, and see whether the *Rasps* will not be the sweeter.

488

Take *Common-Briar*, and set it amongst *Violets*, or *Wall-Flowers*, and see whether it will not make the *Violets*, or *Wall-Flowers* sweeter, and less earthy in their Smell. So set *Lettuce*, or *Cucumbers*, amongst *Rosemary*, or *Bayes*, and see whether the *Rosemary*, or *Bayes*, will not be the more Odorate, or *Aromaticall*.

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Contrariwise, you must take heed how you set *Herbs* together, that draw much the like Juyce. And therefore I think *Rosemary* will leese in Sweetness, if it be set with *Lavender*, or *Bayes*, or the like. But yet, if you will correct the strength of an Herb, you shall do well to set other like Herbs by him, to take him down; And if you would set *Tansy* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Common-Wormwood*, it may be, the *Wormwood* would turn to be liker *Roman-Wormwood*.

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This *Axiom* is of large extent; And therefore would be severed, and refined by *Tryall*. Neither must you expect to have a *Gross Difference* by this kind of Culture, but only *Furthee Perfection*.

Triall would be also made in *Herbs*, *Poysonous*, and *Purgative*, whose ill Qualitie (perhaps) may be discharged, or attempted, by Setting stronger *Poysons*, or *Purgatives*, by them.

It is reported, that the *Shrub* called *Our Ladies Seale*, (which is a Kinde of *Briony*;) and *Coleworts*, set near together, one or both will die. The *Cause* is, for that they be both great Depredatours of the Earth, and one of them starveth the other. The like is said of *Reed*, and a *Brake*; Both which are succulent; And therefore the One deceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw strong Juices.

Some of the Ancients, and likewise divers of the Modern Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sun*, *Moon*, and some Principall *Starres*; And certain *Herbs* and *Plants*. And so they have denominated some *Herbs Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest that there are some *Flowers*, that have *Respect* to the *Sunne* in two *Kinds*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining the Head*. For *Mary-golds*, *Tullippás*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their Leaves abródd, when the *Sunne* shineth serene and fair: And again, (in some part,) close them, or gather them inward, either toward Night, or when the Skie is overcast. Of this there needeth no such Solemn Reason to be assigned, As to say, that they rejoyce at the presence of the *Sunne*; And mourn at the absence thereof. For it is nothing else, but a little loading of the Leaves, and Swelling them at the Bottome, with the Moisture of the Aire; whereas the dry Aire doth extend them: And they make it a Peece of the Wonder, that *Garden Claver* will hide the *Stalke*, when the *Sunne* sheweth bright; which is nothing but a full Expansion of the Leaves. For the *Bowing* and *Inclining the Head*: it is found in the great *Flower* of the *Sunne*; in *Mari-golds*, *Wart-wort*, *Mallow-Flowers*, and others. The *Cause* is somewhat more *Obscure* than the former: But I take it to be no other, but that the Part against which the *Sunne* beateth, waxeth more faint and flaccide in the *Stalke*, and thereby less able to support the *Flower*.

What a little *Moisture* will doe in *Vegetables*, even though they be dead, and severed from the earth, appeareth well in the *Experiment of Fuglers*. They take the *Beard* of an *Oate*; which (if you marke it well) is wreathed at the Bottome, and one smooth entire Straw at the Top. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* half the Breadth of a Finger in length. Then they make a little *Crosse* of a *Quill*, long-ways, of that Part of the *Quill* which hath the Pith; And *Crosse*-ways of that Peece of the *Quill* without Pith: the whole *crosse* being the Breadth of a Finger high. Then they prick the Bottome where the Pith is, and thereinto they put the *Oaten beard*, leaving half of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if somewhat in the Box did work the Feat: In which with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sink down, but to stick. Then likewise by way of *Imposture*, they make a *Question*: As, Who is the fairest Woman in the Company? Or, Who hath a Glove, or Card? And cause Another to name divers Persons: And upon every Naming, they stick the *Crosse* in the Box, having first put it towards their Mouth, as if they charmed it, and the *Crosse* stirreth not: But when they come to the Person that they would take, as they hold the *Crosse* to their Mouth, they touch the *Beard* with the Tip of their Tongue, and wet it, and so stick the *Crosse* in the Box; and then you shall see it turn finely and

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and softly, three or four Turnes; which is caused by the untwining of the *Beard* by the Moisture. You may see it more evidently, if you stick the *Crosse* between your fingers, in stead of the *Box*: And theretore you may see, that this Motion, which is Effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

495 It is reported by some, that the *Herbe* called *Rosa-Solis*, (whereof they make Strong Waters,) will at the Noon-day, when the *Sunne* shineth hot and bright, have a great Dew upon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy* that it hath with the *Sunne*. Men favour Wonders. It were good first to be sure, that the Dew that is found upon it, be not the Dew of the Morning Preserved, when the Dew of other *Herbs* is breathed away: For it hath a smooth and thick Leaf, that doth not discharge the Dew so soon as other *Herbs*, that are more Spungy and Porous. And it may be *Purslane*, or some other Herb, doth the like, and is not marked. But if it be so, that it hath more Dew at Noon than in the Morning, then sure it seemeth to be an Exudation of the *Herb* it self. As *Plummes* sweate when they are set into the Oven: for you will not (I hope) think, that it is like *Gideons Fleece* of *Wooll*, that the Dew should fall upon that, and no where else.

496 It is certain, that the *Honey-dews* are found more upon *Oake leaves*, than upon *Ash*, or *Beech*, or the like: But whether any Cause be from the *Leaf* it self, to concoct the Dew: Or whether it be onely, that the *Leaf* is Close and Smooth, (and therefore drinketh not in the Dew, but preserveth it,) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but upon certain *Herbs* or *Leaves* onely. *Flowers* that have deep *Sockets*, do gather in the bottome, a kinde of *Honey*; as *Honey-Suckles*, (both the *Woodbine*, and the *Trifoile*,) *Lillies*, and the like. And in them certainly the *Flower* beareth part with the *Dew*.

497 The Experience is, that the *Froth*, which they call *Woodfare*, (being like a kinde of Spittle,) is found but upon certain *Herbs*, and those hot Ones; as *Lavender*, *Lavender-cotton*, *Sage*, *Hyssope*, &c. Of the Cause of this enquire further, for it seemeth a Secret. There falleth also *Mildew* upon *Corn*, and smutteth it: But it may be, that the same falleth also upon other *Herbs*, and is not observed.

498 It were good, Triall were made, whether the great Consent between *Plants* and *Water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch onely. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course *Canvass*: Fill it with Earth above the *Canvass*, and let not the Earth be wated: Then sow some good *Seeds* in that Earth: But under the *Canvass*, some half a foot in the Bottome of the *Vessell*, lay a great *Spunge*, thorowly wet in *Water*; and let it lye some ten Dayes; And see whether the *Seeds* will sprout, and the *Earth* become more Moist, and the *Spunge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of *Water*, is farre stranger than this.

Experiments
in Consort,
touching the
Making Herbs
and Fruits
Medicinable.

THe Altering of the *Sent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herb*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance, are but *Fancies*. The Cause is, for that those Things have passed their Period, and nourish not: And all *Alteration* of *Vegetables*, in those Qualities, must be by somewhat that is apt to go into the Nourishment of the *Plant*. But this is true, that where *Kine* feed upon

Wilde Garlick, their *Milk* tasted plainly of the *Garlick*: And the *Flesh* of *Muttons* is better tasted where the *Sheep* feed upon *Wild Thyme*, and other wholefome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milk* of a *Cow*, that feedeth upon certain *Herbs*; And *Honey* in *Spain* smelleth (apparently) of the *Rosemary*, or *Oreng*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Maiden* that was fed with *Napellus*; (which is counted the Strongest poyson of all *Vegetables*) which with use did not hurt the *Maid*, but poysoned some that had *Carnall* Company with her. So it is observed by some, that there is a vertuous *Bezoar*, and another without vertue; Which appear to the shew alike; But the Vertuous is taken from the *Beast*, that feedeth upon the *Mountains*, where there are *Theriaccall Herbs*; And that without Vertue, from those that feed in the *Valleys*, where no such *Herbs* are. Thus far I am of Opinion; That as Steeped *Wines* and *Beers*, are very *Medicinall*; And likewise *Bread* tempered with divers *Powders*; So of *Meat* also, (as *Flesh*, *Fish*, *Milk*, and *Eggs*,) that they may be made of great use for *Medicine*, and *Diet*, if the *Beast*, *Fowl*, or *Fish*, be fed with a special kind of food, fit for the Disease. It were a dangerous Thing also for secret *Empoysonments*. But whether it may be applied unto *Plants*, and *Herbs*, I doubt more; Because the *Nourishment* of them is a more common *Juyce*; Which is hardly capable of any special Quality, untill the *Plant* do assimilate it.

But lest our *Incredulity* may prejudice any profitable *Operations* in this kind (especially since Many of the *Ancients* have set them down,) We think good briefly to propound the four *Meanes*, which they have devised of Making *Plants Medicinable*. The first is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammomy*, *Triacle*, &c. And then binding it up again. This seemeth to me the least probable; Because the *Root* draweth immediately from the *Earth*; And so the *Nourishment* is the more *Common*, and less *Qualified*: And besides it is a long time in *Going* up, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*; Which is somewhat better: For if any *Vertue* be received from the *Medicine*, it hath the less way, and the less time to go up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, wherein the *Medicine* is *Infused*; Which I have little Opinion of, because the *Seed* (I doubt,) will not draw the *Parts* of the *Matter*, which have the *Propriety*: But it will be far the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant* oft, with an *Infusion* of the *Medicine*. This, in one respect may have more force than the rest; Because the *Medication* is oft renewed; Whereas the rest are applied but at one time: And therefore the *Vertue* may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborn to receive those fine *Impressions*; And besides, (as I have said before,) they have a great *Hill* to go up. I judge therefore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in severall places, one above the other; And the *Filling* of the *Holes* with *Dung* mingled with the *Medicine*.

And the *Wating* of those *Lumps* of *Dung*, with *Squirts* of an *Infusion* of the *Medicine* in *Dunged Water*, once in three or four *Dayes*.

1871



NATURALL HISTORY.

VI. Century.



Our Experiments we take care to be, (as we have often said,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Use*, or of *Discovery*; For we hate *Impostures*: And despise *Curiosities*. Yet because we must apply our Selves somewhat to Others, we will set down some *Curiosities touching Plants*.

Experiments
in Comfort,
touching
Curiosities
about *Fruits*
and *Plants*

It is a *Curiosity* to have *several Fruits* upon *one Tree*; And the more, when some of them come *Early*, and some come *Late*; So that you may have, upon the same *Tree*, *Ripe Fruits* all Summer. This is easily done, by Grafting of severall *Cions*, upon severall *Boughes*, of a *Stock*, in a good Ground, plentifully fed. So you may have all Kinds of *Cherries*, and all Kinds of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diversity* of *Fruits* must be such, as will graft upon the same *Stock*. And therefore I doubt, whether you can have *Apples*, or *Peares*, or *Orenges*, upon the same *Stock*, upon which you graft *Plums*.

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It is a *Curiosity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long as a *Cane*; Or as round as a *Sphere*; Or formed like a *Cross*. You may have also *Apples*, in the form of *Peares*, or *Limons*. You may have also *Fruit* in more Accurate *Figures*; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds, Wherein you must understand, that you make the Mould big enough, to contain the whole *Fruit*, when it is grown to the greatest: For else you will choak the Spreading of the *Fruit*; Which otherwise would spread it self, and fill the Concave, and so be turned into the *Shape* desired; As it is in Mould-works of Liquid things. Some doubt may be conceived,

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ceived, that the Keeping of the Sun from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Covered. *Quare* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curiosity*, to have *Inscriptions*, or *Engravings*, in *Fruit*, or *Trees*. This is easily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, so the Letters will grow more large, and Graphicall.

—*Tenerisque meos incidere Amores
Arboribus; crescent illa, crescetis Amores.*

504 You may have *Trees* apparelled with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth* holpen with *Muck*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wild-Thyme*, *Camomill*, and such like in the *Earth*, Wherein they do but grow, in the *Tree*, as they do in *Pots*; Though (perhaps) with some Feeding from the *Trees*. as It would be tried also with *Shoots* of *Vines*, and *Roots* of *Red-Roses*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it self.

505 It is an ordinary *Curiosity*, to *Form Trees* and *Shrubs*, (as *Rosemary*, *Juniper*, and the like,) into *Sundry Shapes*; Which is done by *Moulding* them within, and *Cutting* them without. But they are but lame Things, being too small to keep *Figure*: Great *Castles* made of *Trees* upon *Frames* of *Timber*, with *Turrets*, and *Arches*, were anciently matters of *Magnificence*.

506 Amongst *Curiosities*, I shall place *Colouration*, though it be somewhat better: For *Beauty* in *Flowers* is their *Preheminence*. It is observed by some, that *Gilly-Flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither *Watered*, nor *New Moulded*, nor *Transplanted*, will turn *White*. And it is probable, that the *White*, with much culture, may turn *Coloured*, For this is certain, that the *White Colour* consisteth of *Scarcity* of *Nourishment*; Except in *Flowers* that are only *White*, and admit no other *Colours*.

507 It is good therefore, to see what *Natures* do accompany what *Colours*; For by that you shall have *Light*, how to induce *Colours*, by *Producing* those *Natures*. *Whites* are more *Inodorate*, (for the most part) than *Flowers* of the same kind *Coloured*; As is found in *Single white Violets*, *White-Rose*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. We find also, that *Blossoms* of *Trees* that are *White*, are commonly *Inodorate*; As *Cherries*, *Pears*, *Plums*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are *Blushy*, and *Smell sweet*. The *Cause* is, For that the *Substance* that *Maketh* the *Flower*, is of the *thinnest* and *finest* of the *Plant*; Which also maketh *Flowers* to be of so *dainty Colour*. And if it be too *Sparing*, and *Thin*, it attaineth no *Strength* of *Odour*; Except it be in such *Plants*, as are very *Succulent*; Whereby they need rather to be *scanted* in their *Nourishment*, than *replenished*, to have them *sweet*. As we see in *White Satyrion*, which is of a *Dainty Smell*; And in *Bean-Flowers*, &c. And again, if the *Plant* be of *Nature*, to put forth *White Flowers* only, and those not *thin*, or *drie*, they are commonly of *ranck* and *fulsome Smell*; As *May-Flowers*, and *White Lillies*.

508 Contrariwise, in *Berries*, the *White* is commonly more *Delicate*, and *Sweet* in *Tast*, than the *Coloured*; As we see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The *Cause* is, for that the

the *Coloured* are more juyced, and courfer juyced; And therefore not so well and equally Concocted; But the *White* are better proportioned to the Digestion of the *Plant*.

But in *Fruits*, the *White* commonly is meaner; As in *Pear-Plums*; *Damascins*, &c. And the Choicest *Plummes* are *Blacke*; The *Mulberrie*, (which though they call it a *Berry*, is a *Fruit*;) is better the *Blacke*, than the *White*. The *Harvest White-Plumme*, is a base *Plumme*; And the *Verdoccio* and *White Date-Plumme*, are no very good *Plummes*. The *Cause* is, for that they are all *Overwatry*: Whereas an higher Concoction is required for *Sweetneffe*, or *Pleasure of Taste*, And therefore all your dainty *Plummes*, are a little drie, and come from the *Stone*; As the *Muskle-Plumme*; the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to be *Black*, are of the Nature of *Berries*, sweetest such as are *Paler*; As the *Cœur-Chery*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more sowe.

509

Take *Gilly-Flower-Seed*, of one kinde of *Gilly-Flowers*: (As of the *Clove-Gilly-Flower* which is the most Common; (And sow it; And there will come up *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with *Nourishment* in the *Earth*; So that the *Gardiners* finde, that they may have two or three *Roots* amongst an hundred, that are rare, and of great *Price*; As *Purple*, *Carnation* of several *Stripes*; The *Cause* is, (no doubt,) that in *Earth*, though it be contiguous, and in one *Bed*, there are very severall *Juyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which do come up *Purple*, doe alwayes come up *Single*; The *Juyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leaf*. This *Experiment* of severall *Colours*, comming up from one *Seed*, would be tried also in *Larkes-Foot*, *Monks-Hood*, *Peppery*, and *Hollioke*.

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Few *Fruits* are coloured *Red* within; The *Queen-Apple* is; And another *Apple*, called the *Rose-Apple*, *Mulberries* likewise; and *Grapes*, though most toward the *Skin*. There is a *Peach* also, that hath a *Circle of Red* towards the *Stone*: And the *Egriot-Cherry* is somewhat *Red* within; But no *Pear*, nor *Warden*, nor *Plumme*, nor *Apricot*; although they have (many times) *Red* sides, are Coloured *Red* within. The *Cause* may be enquired.

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The general *Colour* of *Plants* is *Green*, which is a *Colour* that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murry*, or *Reddish*; And they be commonly *Young Leaves* that do so; As it is in *Oakes*, and *Vines*, and *Hasse*, *Leaves* rot into a *Yellow*; And some *Hollies* had part of their *Leaves Yellow*, that are, (to all seeming,) as *Fresh* and *Shining*, as the *Green*. I suppose also, that *Yellow* is a lesse *Succulent Colour*, than *Green*: And a degree nearer *White*. For it hath been noted, that those *Yellow Leaves* of *Holly* stand ever toward the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Blood-Red*, *Stalke* and *Leaf*, and all; As *Amaranthus*. Some *Herbes* incline to *Purple*, and *Red*; As a *Kinde of Sage* doth, and a *Kinde of Mint*, and *Rosa Solis*, &c. And some have *White Leaves*, as another *Kinde of Sage*, and another *Kinde of Mint*; But *Azure* and a *Fair Purple*, are never found in *Leaves*. This sheweth that *Flowers* are made of a refined *Juyce* of the *Earth*; And so are *Fruits*: But *Leaves* of a more *Course*, and *Common*.

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It is a *Curiosity* also to make *Flowers Double*; Which is effected by *Often Removing* them into *New Earth*; As on the contrary part, *Double Flowers*,

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by neglecting, and not Removing, prove *Single*. And the Way, to do it speedily, is to sow or set *Seeds*, or *Slips* of *Flowers*, And as soon as they come up, to remove them into new Ground, that is good; Enquire also, whether *Inoculating* of *Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Musk-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossoms*: But that *Tree* beareth no *Fruit*; And, it may be, that the same Meanes, which applied to the *Tree*, doth extremely accelerate the Sap to rise, and Break forth; Would make the *Tree* spend it self in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that have *Blossoms* *Blush-Coloured*.

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The *Making* of *Fruits* without *Core* or *Stone*, is likewise a *Curiosity*, And somewhat better: Because whatsoever maketh them so, is like to make them more *Tender*, and *Delicate*. If a *Cions* or *Shoot*, fit to be set in the *Ground*, have the *Pith* finely taken forth; (and not altogether, but some of it left, the better to save the life,) it will bear a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to be, of dividing a *Quick-Tree* down to the *Ground*, and *Taking* out the *Pith*, and then binding it up again.

515

It is reported also, that a *Citron* grafted upon a *Quince*, will have small or no *Seeds*; And it is very probable, that any *Sowre-Fruit* grafted upon a *Stock*, that beareth a *Sweeter Fruit*, may both make the *Fruit*, sweeter, and more void of the harsh Matter of *Kernels*, or *Seeds*.

516

It is reported, that not onely the *Taking* out of the *Pith*, but the *Stopping* of the *Juyce* of the *Pith*, from Rising in the *Middest*, and *Turning* it to rise on the *Outside*, will make the *Fruit* without *Core*, or *Stone*; As if you should bore a *Tree* cleane thorow, and put a wedge in. It is true, there is some *Affinity* between the *Pith* and the *Kernell*, because they are both of a harsh Substance, and both placed in the *Middest*.

517

It is reported, that *Trees* *Watered* perpetually with *Warm Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the *Rule* is general, that whatsoever will make a *Wild-Tree*, a *Garden-Tree*, will make a *Garden-Tree* to have lesse *Core*, or *Stone*.

Experiments
in Consort
touching the
Degenerating
of Plants;
And of the
Transmutation
of them, one
into another.

THE *Rule* is certain, that *Plants* for want of *Culture*, degenerate to be bather in the same *Kind*; And sometimes so farre, as to change into another *Kind*. 1. The *Standing long*, and not being *Removed*, maketh them degenerate. 2. *Drought*, unless the *Earth* of it selfe be moist, doth the like. 3. So doth *Removing* into worse *Earth*, or *Forbearing* to compost the *Earth*; As we see that *Water-Mint* turneth into *Field Mint*; And the *Colewort* into *Rape* by Neglect, &c.

518

519

Whatsoever *Fruit* useth to be set upon a *Root*, or a *Slip*, if it be *sown*, will degenerate, *Grapes* *sown*, *Figs*, *Almonds*, *Pomgranate Kernels* *sown*, make the *Fruits* degenerate, and become *Wilde*. And again, Most of those *Fruits* that use to be *grafted*, if they be set of *Kernels*, or *Stones*, degenerate. It is true, that *Peaches*, (as hath been touched before, do better upon *Stones* Set, than upon *Grafting*: And the *Rule* of *Exception* should seem to be this; That whatsoever *Plant* requireth much *Moisture*, prospereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the *Stock*, though it giveth a finer *Nourishment*, yet it giveth a scanter, than the *Earth* at large.

520

Seeds, if they be very *Old*, and yet have strength enough to bring forth a *Plant*, make the *Plant* degenerate. And therefore skilful *Gardiners* make trial of the *Seeds*, before they buy them, whether they be good or no, by *Putting* them

them in. Water gently Boyled; And if they be good, they will sprout within half an Houre.

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turn into *Wild Time*: Although those two *Herbs* seeme to have small Affinity; but *Basill* is almost the onely Hot *Herbe*, that hath Fat and Succulent *Leaves*; Which Oyliness, if it be drawn forth by the *Sunne*, it is like it will make a very great Change. 521

There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *Wild Vines*: Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it self. 522

It is not impossible, and I have heard it verified, that upon *Cutting down* of an Old *Timber-Tree*, the *Stub* hath put out sometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which if it be true, the *Cause* may be, for that the old *Stub* is too scant of Juyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of smaller kind, that needeth lesse Nourishment. 523

There is an Opinion in the Countrey, that if the same *Ground* be oft sown, with the *Graine* that grew upon it, it will, in the end, grow to be of a baser kinde. 524

It is certaine, that in *Sterile Years*, *Corne* sowne will grow to an *Other Kinde*. 525

*Grandia saepe quibus mandavimus Hordea Sulcis,
Infelix Lolium, & steriles dominantur Avena.*

And generally it is a Rule, that *Plants* that are brought forth by *Culture*, as *Corne*, will sooner change into other *Speices*, than those that come of themselves: For that *Culture* giveth but an *Adventitious Nature*, which is more easily put off.

This worke of the *Transmutation of Plants*, one into another, is *inter Maglia Nature*: For the *Transmutation of Speices* is, in the vulgar philosophy, pronounced Impossible: And certainly it is a thing of difficultie, and requireth deep Search into Nature: But seeing there appear some manifest *Instances* of it, the Opinion of *Impossibilitie* is to bee rejected; And the meanes thereof to be found out. We see, that in *Living Creatures*, that come of *Putrefaction*, there is much *Transmutation*, of one into another; As *Caterpillars* turne into *Flies*, &c. And it should seeme probable, that whatsoever *Creature*, having life, is generated without *Seed*. that *Creature* will change out of one *Speices* into another. For it is the *Seed*, and the Nature of it which locketh and boundeth in the *Creature*, that it doth not expatiate. So as we may well conclude, that seeing the Earth, of it self, doth put forth *Plants*, without *Seed*, therefore *Plants* may well have a *Transmigration of Speices*. Wherefore wanting *Instances*, which doe occurre, wee shall give *Directions* of the most likely *Tryalls*: And generally, we would not have those,

that read this Worke of *Sylva Sylvarum*, account it strange, or thinke that it is an Over-Haste, that we have set down Particulars untried; For contrariwise, in our own Estimation, wee account such Particulars, more worthy, than those that are already tried and known. For these Later must be taken as you finde them; But the other do levell Point blank at the *Inventing* of *Causes*, and *Axiomes*.

526

First, therefore you must make account, that if you will have one *Plant* change into another, you must have the *Nourishment* over-rule the *Seed*: And therefore you are to practise it by *Nourishments* as contrary, as may bee, to the *Nature* of the *Herbe*; So nevertheles as the *Herb* may grow, And likewise with *Seeds* that are of the Weakest Sort, and have least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them upon *Tops* of *Hills*, and *Champaignes*; And such *Plants* as require much *Moisture*, upon *Sandy* and very *drie* *Grounds*. As for Example, *Marsh-Mallows*, and *Sedge*, upon *Hills*; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, upon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, & *Brakes* upon a *Wet* or *Marsh Ground*. This I conceive also, that all *Esculent* & *Garden Herbs*, set upon the *Tops* of *Hills*, will prove more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wild Herbs* you may make *Sallet Herbs*. This is the first Rule for *Transmutation* of *Plants*.

527

The second Rule shall bee to bury some few *Seeds*, of the *Herb* you would change, amongst other *Seeds*; And then you shall see, whether the *Juyce* of those other *Seeds* do not so qualifie the *Earth*, as it will alter the *Seed*, whereupon you work. As for Example, Put *Parshly-Seed* amongst *Onion Seed*; Or *Lettuce Seed* amongst *Parshly Seed*; Or *Basill-Seed* amongst *Thyme-Seed*; And see the Change of *Taite*, or otherwise. But you shall do well to put the *Seed* you would change, into a litle linnen Cloth, that it mingle not with the forain *Seed*.

528

The third Rule shall be, the making of some *Medley* or *Mixture* of *Earth*, with some other *Plants Bruised*, or *Shaven*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort Leaves* stamped, and set in it *Artichoakes*, or *Parshnips*; So take *Earth* made with *Majoram*, or *Origannm*, or *Wild-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the *Proces* of *Nature* still will be, (as I conceive,) not that the *Herbe* you worke upon, should draw the *Juyce* of the *Forrain Herbe*, (For that opinion we have formerly rejected;) But there will be a *New Confection* of *Mould*, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herb*.

529

The fourth Rule shall be, to mark what *Herbs*, some *Earths* doe put forth of themselves; And to take that *Earth*, and to *Pot* it, or to *Vessell* it; And in to that set the *Seed*, you would change: As for Example, take from under *Walls*, or the like, where *Nettles* put forth in abundance, the *Earth* which you shall there finde, without any *String*, or *Root* of the *Nettles*; And *Pot* that *Earth*, and set in it *Stock-Gilly-flowers*, or *Wall-flowers*, &c. Or sow in the *Seeds* of them; And see what the *Event* will be: Or take *Earth*, that you have prepared to put forth *Mushromes*, of it self, (whereof you shall finde some *Instances* following;) And sow it in *Purslane-Seed*, or *Lettuce-Seed*, for in these *Experiments*, it is likely enough, that the *Earth* being accustomed to send forth one Kinde of *Nourishment*, will alter the new *Seed*.

The fifth Rule shall be, to make the *Herb* grow contrary to his *Nature* ; As to make *Ground-Herbs* rise in *Height* : As for example ; Carry *Camo-mile*, or *Wild-Thyme*, or the *Green Strawberry*, upon *Sticks*, as you do *Hops* upon *Poles* ; And see what the *Event* will be.

530

The sixth Rule shall be, to make *Plants* grow out of the *Sunne*, or *Open Air* ; For that is a great *Mutation* in *Nature* ; And may induce a *Change* in the *Seed* : As barrell up *Earth*, and sow some *Seed* in it, and put it in the *Bot-tome* of a *Pond* ; Or put it in some great hollow *Tree* ; *Trie* also the *Sow-ing* of *Seeds* in the *Bottomes* of *Caves* ; And *Pots* with *Seeds* sown, hanged up in *Wels*, some distance from the *Water*, and see what the *event* will be.

531

IT is certain, that *Timber-Trees* in *Coppice Woods*, grow more upright, and more free from *Under-Boughs*, than those that stand in the *Fields* : The *Cause* whereof is, for that *Plants* have a *Naturall Motion*, to get to the *Sunne*, And besides, they are not glutted with too much *Nourishment* ; For that the *Coppice* shareth with them ; And *Repletion* ever hindereth *Stature* ; Lastly, they are kept warm ; And that ever in *Plants* helpeth *Mounting*.

Experiments in Consort touching the *Procerity*, and *Lowness*, and *Artificiall dwarfing* of *Trees*.

Trees, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gums*,) as *Firrs*, and *Pines*, mount of themselves in *Height* without *Side-Boughs*, till they come towards the *Top*. The *Cause* is partly *Heat* ; And partly *Tenuity* of *Juyce* ; Both which send the *Sap* upwards. As for *Juniper*, it is but a *Shrub*, and groweth not bigge enough in *Body*, to maintain a tall *Tree*.

532

533

It is reported, that a Good Strong *Canvās* ; spread over a *Tree* grafted low, soon after it putteth forth, will *dwarf* it, and make it spread. The *Cause* is plain ; For that all Things that grow, will grow as they find *Room*.

534

Trees are generally set of *Roots*, or *Kernels* ; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take ; And those that take, (as is reported) will be *Dwarf-Trees*. The *Cause* is, for that a *Slip* draweth *Nourishment* more weakly, than either a *Root*, or *Kernell*.

535

All *Plants* that put forth their *Sap* hastily, have their *Bodies* not proportionable to their *Length* ; And therefore they are *Winders* and *Creepers* ; As *Ivy*, *Briony*, *Hops*, *Woodbine* : Whereas *Dwarfing* requireth a slow *Putting* forth, and less *Vigour* of *Mounting*.

536

The *Scripture* saith, that *Solomon* wrote a *Naturall History* : from the *Cedar* of *Libanus*, to the *Moss* growing upon the *Wall* : For so the best *Translations* have it. And it is true that *Moss* is but the *Rudiment* of a *Plant* ; And (as it were) the *Mould* of *Earth*, or *Bark*.

Experiments in Consort, touching the *Rudiments* of *Plants*, and of the *Excrecences* of *Plants*, or *Super-Plants*.

Moss groweth chiefly upon *Ridges* of *Houses*, tiled or thatched ; And upon the *Crests* of *Walls*. And that *Moss* is of a lightsome and pleasant *Green* : The *Growing* upon *Slopes* is caused, for that *Moss*, as on the one side it cometh of *Moiture* and *water*, so on the other side the *Water* must but *Slide*, and not stand or *Poole*. And the *Growing* upon *Tiles*, or *Walls*, &c. is caused, for that those dried *Earths*, having not *Moisture* sufficient to put forth a *Plant*, do practise *Germination* by *Putting* forth *Moss* : Though when by *Age*, or otherwise, they grow to relent and resolve, they

537

sometimes

sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Moss* hath here and there little *Stalks*, besides the low *Thrum*.

538

Moss groweth upon *Alleyes*, especially such as lie Cold, and upon the North; As in divers *Tarrasses*: And again, if they be much trodden; Or if they were at the first, gravelled; For wheresoever *Plants*, are kept down, the Earth putteth forth *Moss*.

539

Old Ground, that hath been long unbroken up, gathereth *Moss*: And therefore Husbandmen use to cure their *Pasture-Grounds*, when they grow to *Moss*, by Tilling them for a year, or two: Which also dependeth upon the same *Cause*; For that the more Sparing and Starving Juice of the Earth, insufficient for *Plants*, doth breed *Moss*.

540

Old Trees are more *Mossie*, (farre) than *Young*; For that the Sap is not so frank as to rise all to the *Boughes*, but tyreth by the Way, and putteth out *Moss*.

541

Fountains have *Moss* growing upon the *Ground* about them;
Muscoti Fontes;

The *Cause* is, for that the *Fountaines* draine the *Water* from the *Ground Adjacent*, and leave but sufficient *Moisture* to breed *Moss*: And besides, the *Coldness* of the *Water* conduceth to the same.

542

The *Moss* of *Trees*, is a kind of *Hair*; For it is the Juice of the *Tree*, that is Excerned, and doth not Assimilate. And upon great *Trees* the *Moss* gathereth a Figure, like a *Leaf*.

543

The *Moister Sort* of *Trees* yeeld little *Moss*; As we see in *Asps*, *Poplars*, *Willows*, *Beeches*, &c. Which is partly caused for the Reason that hath been given, of the frank Putting up of the *Sap* into the *Boughes*; And partly, for that the *Barks* of those *Trees*, are more Close, and Smooth, than those of *Oakes*, and *Ashes*; Whereby the *Moss* can the hardlier issue out.

544

In *Clay-Grounds*, all *Fruit-Trees* grow full of *Moss*, both upon *Body* and *Boughes*; Which is caused, partly by the *Coldness* of the *Ground*, whereby the *Plants* nourish less; And partly by the *Toughness* of the *Earth*, whereby the *Sap* is shut in, and cannot get up, to spread so frankly, as it should do.

545

We have said heretofore, that if *Trees* be *Hide-bound*, they wax less Fruitfull, and gather *Moss*: And that they are holpen by *Hacking*, &c. And therefore by the Reason of Contraries, if *Trees* be bound in with *Cords*, or some *Outward Bands*, they will put forth more *Moss*: Which (I think) happeneth to *Trees* that stand Bleak, and upon the Cold Winds. It would also be tried, whether, if you cover a *Tree*, somewhat thick upon the top, after his *Powling*, it will not gather more *Moss*. I think also, the *Watring* of *Trees* with *Cold Fountain Water*, will make them grow full of *Moss*.

546

There is a *Moss* the *Perfumers* have, which cometh out of *Apple-Trees*, that hath an Excellent Sent. *Quare* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* sake, being a Thing of Price, I have set down the last *Experiments*, how to multiply, and call on *Mosses*.

Next unto *Moss*, I will speak of *Musbromes*; Which are likewise an *unperfect Plant*. The *Musbromes* have two strange *Properties*; The One, that they yeeld so *Delicious* a *Meat*; The other, that they come up so *basily*, As in a *Night*, and yet they are *unfown*. And therefore such as are *Upstarts* in *State*, they

call, in reproach, *Mushromes*. It must needs be therefore, that they be made of much *Moisture*; And that *Moisture* Fat, Gross, and yet somewhat Concocted. And (indeed) we find, that *Mushromes* cause the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomach*. And therefore the *Surfet* of them may Suffocate, and Emroyson. And this sheweth; that they are Windy; And that Windiness is Gross, and Swelling, Not Sharp, or Griping. And upon the same reason *Mushromes* are a venereous Meat.

It is reported, that the *Bark* of *White*, or *Red Poplar*, (which are of the Moistest of *Trees*), cut small, and cast into *Furrows* well dunged, will cause the *Ground* to put forth *Mushromes*, at all *Seasons* of the *Year*, fit to be eaten. Some adde to the Mixture *Leaven* of *Bread*, resolved in *Water*. 547

It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, be set on *Fire*, in the *Showry Season*, it will put forth great Store of *Mushromes*. 548

It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeeces*, mixed with *Dung*, and *watred*, putteth up *Mushromes*. And we know that *Harts-Horne* is of a Fat and Clammie Substance: And it may be *Oxe-Horne* would do the like. 549

It hath been reported, though it be scarce credible, that *Ivy* hath grown out of a *Stags-Horne*; which they suppose did rather come from a *Consecration* of the *Horne* upon the *Ivy*, than from the *Horne* it self. There is not known any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Meß*, or *Herby Substance*. There may be *Triall* made of some *Seeds*, as that *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow. 550

There is also another *Unperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones *Hat*; Which they call a *Toads-Stool*: But it is not *Esculent*; And it groweth (commonly) by a dead *Stub* of a *Tree*; And likewise about the *Roots* of *Rotten-Trees*: And therefore seemeth to take his *Juyce* from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a frank *Moisture*. 551

There is a *Cake* that groweth upon the *Side* of a *Dead Tree*, that hath gotten no Name, but it is large, and of a *Chestnut Colour*, and hard and pithy; Whereby it should seem, that even *Dead Trees* forget not their *Putting forth*; No more than the *Carcasses* of *Mens Bodies* that put forth *Hair*, and *Nails*, for a *Time*. 552

There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* upon the *Breaking*: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corrosive*, and *Fretting Nature*. 553

There is an *Herb* called *Fewes-Ear*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange *Propertie*; For in *Warm Water*, it swelleth, and openeth extremely. It is not green, but of a duskie brown *Colour*. And it is used for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to have a *Mollifying*, and *Lenifying Vertue*. 554

555 There is a Kind of *Spongie Excrecence*, which groweth chiefly upon the *Roots* of the *Laser-Tree*; And sometimes upon *Cedar*, and other *Trees*. It is very *White*, and *Light*, and *Friable*: Which we call *Agarick*. It is famous in *Physick* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liver*: But *Offensive* to the *Stomack*; And in *Taste* it is, at the first, *Sweet* and after *bitter*.

556 We find no *Super-Plant*, that is a *Formed Plant*, but *Misseltoe*. They have an idle *Tradition*, that there is a *Bird*, called a *Missel-Bird*, that feedeth upon a *Seed*, which many times she cannot digest, and so expelleth it whole with her *Excrement*: which falling upon a *Bow* of a *Tree*, that hath some *Rift*, putteth forth *Misseltoe*. But this is a *Fable*; For it is not probable, that *Birds* should feed upon that they cannot digest. But allow that, yet it cannot be for other *Reasons*: For First, it is found but upon certain *Trees*; And those *Trees* bear no such *Fruit*, as may allure that *Bird* to sit and feed upon them. It may be, that *Bird* feedeth upon the *Misseltoe-Berries* and so is often found there; Which may have given occasion to the *Tale*. But that which maketh an *End* of the *Question*, is, that *Misseltoe* hath been found to put forth under the *Boughes*, and not (only) above the *Boughes*: So it cannot be any *Thing* that falleth upon the *Bough*. *Misseltoe* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, sometimes upon *Hales*; And rarely upon *Oakes*; The *Misseltoe* whereof is counted very *Medicinnall*. It is ever green, *Winter* and *Summer*; And beareth a *White Glistering Berry*: And it is a *Plant*, utterly differing from the *Plant* upon which it groweth. Two things therefore may be certainly set down: First, that *Super-fatation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth excerne, and cannot assimilate; For else it would go into a *Bough*; And besides, it seemeth to be more *Fat* and *Unctuous*, than the *Ordinary Sap* of the *Tree*; Both by the *Berry*, which is *Clammie*; And by that it continueth green, *Winter* and *Summer*, which the *Tree* doth not.

557 This *Experiment* of *Misseltoe* may give *Light* to other *Practices*. Therefore *Trial* would be made, by *Ripping* of the *Bough* of a *Crab-Tree*, in the *Bark*; And *Wating* of the *Wound* every *Day*, with *Warne Water Dugged*, to see if it would bring forth *Misseltoe*, or any such like *Thing*. But it were yet more likely to trie it, with some other *Wating* or *Anointing*, that were not so *Naturall* to the *Tree*, as *Water* is; As *Oyl*, or *Barme* of *Drink*, &c. So they be such *Things* as kill not the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they be forbidden to put forth their *Naturall Boughs*: Poll therefore a *Tree*, and cover it, some thickness, with *Clay* on the *Top*; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned down into *Clay*: Therefore, in this *Experiment* also, the *Tree* would be closed with somewhat, that is not so *Naturall* to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certain, that a *Brake* hath been known to grow out of a *Pollard*.

559 A *Man* may count the *Prickles* of *Trees* to be a kind of *Excrecence*, For they will never be *Boughes*, nor bear *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, black and white; *Brier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Berbergy*; These have it in the *Bough*; The *Plants* that have *Prickles* in the *Leafe*, are, *Holly*; *Juniper*; *Whin-bush*; *Thistle*; *Nettles* also have a small *Venemous Prickle*; So hath *Borrage*, but harmeles. The *Cause* must be *Hastie Putting forth*; *Want* of *Moisture*; And the *Clofeness* of the *Barke*; For the

the *Haste* of the *Spirit* to put forth, and the *Want* of *Nourishment* to put forth a *Bough*, and the *Cloſeneſſe* of the *Bark*, cauſe *Prickles* in *Boughs*; And therefore they are ever like a *Pyramis*, for that the *Moifture* ſpendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come alſo of *Putting forth more Iuyce* into the *Leaſe*, that can ſpread in the *Leaſe* ſmooth; and therefore the *Leaves* otherwiſe are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *ſmooth*, bnt never *Plaine*, but as it were with *Folds*, for the ſame *Cauſe*.

560

There be alſo *Plants*, that though they have no *Prickles*, yet they have a *Kinde* of *Downey* or *Velvet Rine*, upon their *Leaves*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*, which *Downe* or *Nap* commeth of a *ſubtil Spirit*, in a *Soft* or *Fat Subſtance*. For it is certain, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, ſtamped, have been applyed, (with ſucceſſe,) to the *Wreſts* of thoſe that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* have a *Sanative vertue*, towards the *Lungs*; And the *Leaſe* alſo is *Healing* in *Surgery*.

561

Another kinde of *Excreſcence* is an *Exaudation* of *Plants*, joyned with *Pu-trefaction*; As wee ſee in *Oake-Apples*, which are found chiefly upon the *Leaues* of *Oakes*; And the like upon *Willowes*: And *Countrey People* have a kind of *Prediction*, that if the *Oake-Apple*, broken, be full of *Worms*, it is a *Signe* of a *Peſtilent Year*; Which is a likely Thing, becauſe they grow of *Corruption*.

562

There is alſo upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Moſſe*, of divers *Colours*; Which if you cut, you ſhall ever finde full of little white *Worms*.

IT is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houſes*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth *Sundry Kinds* of *Herbs*: But ſome *Time* is required, for the *Germination*; For if it be taken, but from a *Fathome* deep, it will put forth the *Fiſt Year*; If much deeper, not till after a *Year*, or *Two*.

Experiments in Conſort, touching the Producing of Perſect Plants without Seed.

563

564

The *Nature* of the *Plants* growing out of *Earth* ſo taken up, doth follow the *Nature* of the *Mould* it ſelf; As if the *Mould* be *Soft*, and *Fine*, it putteth forth *Soft Herbs*; As *Graffe*, *Plantine*, and the like; If the *Earth* be *Harder* and *Courſer*, it putteth forth *Herbs* more *Rough*, as *Thiſtles*, *Firrs*, &c.

565

It is *Common Experience*, that where *Alleys* are cloſe *Gravelled*, the *Earth* putteth forth, the *fiſt* yeare, *Knot-Graffe*, and after *Spire-Graffe*. The *Cauſe* is, for that the *Hard Gravel*, or *Pebble* at the *fiſt Laying*, will not ſuffer the *Graffe* to come forth upright, but turneth it to finde his way where it can; But after that the *Earth* is ſomewhat looſened at the *Top*, the *Ordinary Graffe* commeth up.

566

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, ſome depth, and *Potted*, will put forth *Herbs* of a *Fat* and *Iuicie Subſtance*; As *Penny-Wort*, *Purſlane*, *Houſleeke*, *Penney-royall*, &c.

567

The *Water* alſo doth ſend forth *Plants*, that have no *Roots* fixed in the *Bottom*; But they are leſſe *Perſect Plants*, being almoſt but *Leaves*, and thoſe *Small ones*: Such is that we call *Duck-Weed*; Which hath a *Leaſe* no bigger than a *Thyme Leaſe*, but of a *freſher Greene*, and putteth forth a little *String* into the *Water*, farr from the *Bottom*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And ſo have a *Number* of other *Herbs* that grow in *Ponds*.

568

It is reported by some of the *Antients*, and some *Moderne Testimonie* likewise, that there be some *Plants*, that grow upon the Top of the *Sea*; Being supposed to grow of some *Concretion of Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* stirreth little. As for *Alga Marina*, *Sea weed*,) and *Eryngium*, (*Sea-Thistle*,) both the *Roots*; but have *Sea-weed* under the *Water*, the *Sea-Thistle* but upon the *Shore*.

569

The *Antients* have noted, that there are some *Herbs*, that grow out of *Snow*, laid up close together, and *Putrified*; And that they are all *Bitter*; And they name one especially, *Floemus*, which we call *Moth-Mullein*. It is certain, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewise put forth *Plants*.

570

The *Antients* have affirmed, that there are some *Herbs*, that grow out of *Stone*; Which may be, for that it is certain, that *Toads* have been found in the Middle of a *Free-Stone*. We see also, that *Flints*, lying above *Ground*, gather *Mosse*; And *Wall-Flowers*, and some other *Flowers*, grow upon *Walls*; But whether upon the *Maine Bricke*, or *Stone*, or whether out of the *Lime*, or *Chinks*, is not well observed, For *Elders* and *Ashes* have been seen to grow out of *Steeple*: But they manifestly grow out of *Clefts*; In so much as when they grow bigge, they will dis-joyne the *Stone*. And besides, it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rock-Herbs*; But I suppose those are, where there is some *Mould* or *Earth*. It hath likewise been found, that great *Trees* growing upon *Quarries*, have put down their *Root* into the *Stone*.

571

In some *Mines* in *Germany*, as is reported, there grow in the *Bottome* *Vegetables*; And the *Worke-Folks* use to say, they have *Magickall Vertue*; And will not suffer men to gather them.

572

The *Sea-Sands* seldom bear *Plants*. Whereof the *Cause* is yeilded, by some of the *Antients*, for that the *Sunne* exhaleth the *Moisture*, before it can incorporate with the *Earth*, and yeeld a *Nourishment* for the *Plant*. And it is affirmed also, that *Sand* hath (alwayes) his *Root* in *Clay*; And that there be no *Veines* of *Sand*, any great depth within the *Earth*,

573

It is certaine, that some *Plants* put forth for a time, of their own *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment 29*.

Experiments
in Confort
touching
Forraine
Plants.

574

It is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* for *Ships*, cast upon some *Grounds* in *Italy*, did put forth *Forraine Herbs*, to us in *Europe* not known; And, that which is more, that of their *Roots*, *Barks*, and *Seeds*, contused together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other.

575

Plants brought out of *Hot Countries*, will endeavour to put forth, at the same *Time*, that they do usually doe in their own *Climate*. And therefore to preserve them, there is no more required, than to keep them from the Injury of Putting back by *Cold*. It is reported also, that *Graine* out of the *Hotter Countries* translated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Country*. It is likely, that this will prove better in *Grains*, than in *Trees*; For that *Graines* are but *Annually*; And so the *Vertue* of the *Seed* is not worne-out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is Removed.

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Many *Plants*, which grow in the *Hotter Countries*, being set in the *Colder*.

der, will neverthelesse, even in those *Cold Countries*, being sown of *Seeds* late in the *Spring*, come up and abide most part of the *Summer*; As we finde it in *Orange*, and *Limon-Seeds*, &c. The *Seeds* whereof sown in the End of *April*, will bring forth excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Green* enough to be sown, would do the like.

Here be some *Flowers*, *Blossomes*, *Grains*, and *Fruit*, which come more *Early*, And others which come more *Late* in the *Yeare*. The *Flowers* that come early, with us, are, *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffodillies*, *Crocus Vernus*, and some early *Tulippa's*. And they are all *Cold Plants*, Which therefore, (as it should seem,) have a quicker *Perception* of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* have; As a *Cold Hand* will sooner find a little *Warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Cowslips*, *Hyacinths*, *Rose-mary-Flowers*, &c. And after them *Pinks*, *Roses*, *Flowerdeluces*, &c. and the latest are *Gilly-Flowers*, *Holly-Oakes*, *Larkes-Foot*, &c. The Earliest *Blossoms* are, the *Blossoms* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of such *Trees*, as have much *Moisture*, either *Watery*, or *Oily*. And therefore *Crocus Vernus* also, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Grains* are, first *Rie* and *Wheat*; Then *Oats* and *Barley*; Then *Pease* and *Beanes*, For though *Green Pease* and *Beanes* be eaten sooner, yet the *Drie Ones*, that are used for *Horse-Meat*, are ripe last; And it seemeth that the *Fatter Graine* cometh first. The Earliest *Fruits* are, *Strawberries*, *Cherries*, *Gooseberries*, *Corrans*; And after them *Early Apples*, *Early Pears*, *Apricots*, *Rasps*; And after them, *Damasins*, and most Kinde of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Frier-berries*, *Heps*, *Medlars*, *Services*, *Cornelians*, &c.

It is to be noted, that (commonly) *Trees* that ripen latest, *Blossome* soonest: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a *Worke* of *Providence*, that they blossome so soone; For otherwise they could not have the *Sunne* long enough to ripen.

There be *Fruits*, (but rarely,) that come *twice a Year*; as some *Pears*, *Strawberries*, &c. And it seemeth they are such, as abound with *Nourishment*; Whereby after one *Period*, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*, cometh *twice a Year*; Especially the *Double White*; And that also is a *Plant* full of *Moisture*. *Roses* come *twice*, but it is not without *Cutting*, as hath been formerly said.

In *Muscovia*, though the *Corne* come not up, till late *Spring*, yet their *Harvest* is as *Early* as *Ours*. The *Cause* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And we see with us, that if it be a long *Winter*, it is commonly a more *Plentifull Year*: And after those kinde of *Winters* likewise, the *Flowers*, and *Corne*, which are *Earlier*, and *Later*, do come commonly at once, and at the same time; Which troubleth the *Husbandman* many times: For you shall have *Red-Roses*, and *Damask Koses*, come together; And likewise the *Harvest* of *Wheat* and *Barley*. But this happeneth ever, for that the *Earlier* stayeth the *Latter*; And not that the *Later* cometh sooner.

There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the *Yeare*, succeeding one another. And it is said, the *Orange* hath the like with us, for a great Part of *Summer*;

Experiments in
Confort,
touching the
Seasons in
which Plants
come forth.

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Summer; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to have so; But that either they want *Juyce* to spend; Or they meet with the *Cold* of the *Winter*. And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*,

582

Some *Herbs* are but *Annuall*, and die, *Root* and all, once a *Yeare*; As *Borage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tobacco*, *Mustard-Seed*, and all kindes of *Corne*; Some continue many *Years*; As *Hyslope*, *Germander*, *Lavender*, *Fennell*, &c. The *Cause* of the *Dying* is *double*; The first is the *Tendernesse* and *Weakenesse* of the *Seed*, which maketh the *Period* in a small time; As it is in *Borage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are *Hot*. The other *Cause* is, for that some *Herbs* can worse endure *Cold*, As *Basill*, *Tobacco*, *Mustard-Seed*. And these have (all) much *Heat*.

Experiments
in Consort,
touching the
Lasting of
Herbs and
Trees.

583

The *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oaks*, *Elme*, *Chest-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Coleworts*, *Pompions*, which are *Herbs* of the *Largest Size*, are of small *Durance*; Whereas *Hyslope*, *Winter-Savory*, *Germander*, *Thyme*, *Sage*, will last long. The *Cause* is, for that *Trees* last according to the *Strength*, and *Quantity* of their *Sap* and *Juyce*; Being well munited by their *Barke* against the *Injuries* of the *Aire*: But *Herbs* draw a *Weak Juyce*; And have a soft *Stalk*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Sticke* *Stalke*.

584

Trees that beare *Mast*, and *Nuts*, are commonly more *lasting*, than those that beare *Fruits*; Especially the *Moist* *Fruits*: As *Oakes*, *Beeches*, *Chest-nuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Pears*, *Plums*, &c. The *Cause* is the *Fatnesse* and *Oylineesse* of the *Sap*; Which ever wasteth lesse, than the more *Watry*.

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Trees that bring forth their *Leaves* late in the *Year*, and cast them likewise late, are more *lasting*, than those that sprout their *Leaves* Early, or shed them betimes. The *Cause* is, for that the late *Coming forth* sheweth a *Moisture* more fixed; And the other loose, and more easily resolved. And the same *Cause* is, that *Wild-Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is *Acide*, more than those whose *Fruit* is sweet.

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Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For every *Cutting* causeth a *Renovation* of the *Juyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Infomuch as *Annuall Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come up still young, will last more *Years* than one; As hath been partly touched; Such as is *Lettuce*, *Purslane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Overgrown-Trees*, in *Church-yards*, or near ancient *Building*, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full height.

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Some *Experiment* would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinary *Period*; As to make a *Stalke* of *Wheat*, &c. last a whole *yeare*. You must ever presuppose, that you handle it so, as the *Winter* killeth it not; For we speak only of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatsoever maketh the *Herb* come later, than at his time, will make it last longer time: It were good to trie it, in a *Stalke* of *Wheat*. &c. set in the *Shade*, and encompassed with a *Cafe* of *Wood*, not touching the *Straw*, to keep out open *Aire*.

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As for the *Preservation* of *Fruits*, as well upon the *Tree*, or *Stalk*,

as

as gathered, we shall handle it under the Title of Conservation of Bodies.

THe Particular Figures of Plants we leave to their Descriptions; But some few Things in generall, we will observe. *Trees* and *Herbs*, in the Growing forth of their *Boughs*, and *Branches*, are not *Figured*, and keep no Order. The Cause is, for that the *Sap*, being restrained in the *Rinde*, and *Bark*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalks* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they break forth casually, where they find best way, in the *Bark*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughs*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Pear-Trees*, (which the *Criticks* will have to borrow his name of $\pi\upsilon\rho$ & *Fire*.) *Orange-Trees*, *Firre-Trees*, *Service-Trees*, *Lime-Trees*, &c. And some are more spread and broad; As *Beeches*, *Hornebeame*, &c. The rest are more indifferent. The Cause of Scattering the *Boughs*, is the Hasty breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but Branch near the *Ground*. The Cause of the *Pyramis*, is the Keeping in of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equal degrees. The *Spreading* is caused by the *Carrying* up of the *Sap*, plentifully, without Expense; And then putting it forth speedily, and at once.

There be divers *Herbs*, but no *Trees*, that may be said to have some kind of Order, in the Putting forth of their *Leaves*: For they have *Foynts*, or *Knuckles*, as it were Stops in their *Germination*, As have *Gilly-Flowers*, *Pinks*, *Fennell*, *Corn*, *Reeds*, and *Canes*. The Cause whereof is, for that the *Sap* ascendeth unequally, and doth (as it were) tire and stop by the way. And it seemeth, they have some *Cloosenesse*, and *Hardnesse* in their *Stalk*, which hindreth the *Sap* from going up, untill it hath gathered into a *Knot*, and so is more urged to put forth. And therefore, they are most of them hollow, when the *Stalk* is drie: As *Fennell-Stalks*, *Stubble*, and *Canes*.

Flowers have (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Four*; As in *Prime-Roses*, *Bryer-Roses*, *Single-Musk-Roses*, *Single-Pinks*, and *Gilly-Flowers*, &c. which have five *Leaves*: *Lillies*, *Flower-de-luces*, *Borage*, *Bugloss*, &c. which have four *Leaves*. But some put forth *Leaves* not Numbred; But they are ever small Ones; As *Mary-Golds*, *Trifole*, &c. We see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the *Five Brethren* of the *Rose*, *Sockets* of *Gilly-Fowers*, &c. *Leaves* also are all *Figured*; Some Round; Some Long; None Square; and many jagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Jagging* of *Pinks*, and *Gilly-Flowers*, to be like the inequality of *Oak-Leaves*, of *Vine-Leaves*, or the like; But they seldome or never have any small *Purles*,

OF *Plants*, some few put forth their *Blossoms* before their *Leaves*, As *Almonds*, *Peaches*, *Cornelians*, *Black-Throne*, &c. But most put forth some *Leaves* before their *Blossoms*, as *Apples*, *Pears*, *Plums*, *Cherry*, *White-Thorn*, &c. The Cause is, for that those, that put forth their *Blossoms* first, have either an *Acute* and *Sharp Spirit*; (And thieretoe commonly they all put forth early in the Spring, and ripen very late, As most of the Particulars before mentioned;) Or else an *Oylie Juice*, which is apter to put out *Flowers*, than *Leaves*.

Of *Plants*, some are *Green* all *Winter*; Others cast their *Leaves*. There are *Green* all *Winter*, *Holly*, *Ivy*, *Box*, *Firre*, *Eugh*, *Cypress*, *Juniper*, *Bayes*, *Rose-Mary*, &c. The Cause of the *Holding Green*, is the *Clothe* and *Compact Substance*

Experiments in Confort, touching the several Figures of Plants.

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Experiments in Confort, touching some Principall Differences in Plants.

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stance of their *Leaves*, and the *Pedicles* of them. And the *Cause* of that again, is either the *Tough* and *Viscous* *Juyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*; Which is of to *Viscous* a *Juyce*, as they make *Birdlime* of the *Bark* of it. The *Stalk* of *Ivy* is *Tough*, and not *Fragile*, as we see in other small *Twigs* drie. *Firre* yieldeth *Pitch*. *Box* is a fast and heavy *Wood*, as we see it in *Bouls*. *Eugh* is a Strong and *Tough* *Wood*, as we see it in *Bowes*. Of the Second Sort is *Fjuniter*, which is a *Wood* *Odorate*, and maketh a hot *Fire*. *Bayes* is like-wife a *Hot* and *Aromatical* *Wood*, And so is *Rose-Mary* for a *Shrub*. As for the *Leaves*, their *Density* appeareth, in that, either they are *Smooth* and *Shining*, as in *Bayes*, *Holly*, *Ivy*, *Box*, &c. Or in that they are *Hard* and *Spirie*, as in the rest. And *Triall* would be made of *Grafting* of *Rose-Mary*, and *Bayes*; and *Box*, upon a *Holly-Stock*; Because they are *Plants* that come all *Winter*. It were good to trie it also with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wild Trees*; To see whether they will not yeeld their *Fruit*, or bear their *Leaves*, later, and longer in the *Winter*; because the *Sap* of the *Holly* putteth forth most in the *Winter*. It may be also a *Mezerion-Tree*, grafted upon a *Holly*, will prove both an *Earlier*, and a *Greater* *Tree*.

593

There be some *Plants*, that bear no *Flower*, and yet bear *Fruit*: There be some, that bear *Flowers*, and no *Fruit*: There be some, that bear neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) bear no apparent *Flowers*: Some few (likewise) of the *Fruit-Trees*; As *Mulberry*, *Walnut*, &c. And some *Shrubs*, (as *Fjuniper*, *Holly*, &c.) bear no *Flowers*. Divers *Herbs* also bear *Seeds*, (which is as the *Fruit*;) and yet bear no *Flowers*; As *Parplane*, &c. Those that bear *Flowers*, and no *Fruit*, are few; As the *Double Cherry*, the *Sallow*, &c. But for the *Cherry*, it is doubtfull, whether it be not by *Art*, or *Culture*; For if it be by *Art*, then *Triall* would be made, whether *Apples*, and other *Fruits* *Balsomes*, may not be doubled. There are some Few, that bear neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

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There be some *Plants*, that shoot still upwards, and can *Support* themselves: As the greatest Part of *Trees*, and *Plants*: There be some Other, that *Creep* along the *Ground*; or *Wind* about other *Trees*, or *Props*, and cannot support themselves; As *Vines*; *Ivy*; *Bryar*; *Briony*; *Wood-bines*; *Hop's*; *Climatis*; *Camomill*, &c. The *Cause* is, (as hath been partly touched,) for that all *Plants*, (naturally) move upwards; But if the *Sap* put up too fast, it maketh a slender *Stalk*, which will not support the weight: And therefore these latter Sort are all *Swift* and *Hastie* *Comers*.

Experiments
in Confort,
touching all
Manner of
Composts; and
Help, of
Ground.

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THE first and most Ordinary *Help* is *Stercoration*. The *Sheeps-Dung* is one of the best; And next, the *Dung* of *Kine*: And thirdly, that of *Horses*: Which is held to be somewhat too hot, unlesse it be mingled. That of *Pigeons* for a *Garden*, as a small *Quantity* of *Ground*, Excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to spread it immediately before the *Ploughing* and *Sowing*; And so to *Plough* it in: For if you spread it long before, the *Sunne* will draw out much of the *Fatnesse* of the *Dung*: If the *Ground* be *Grazing* *Ground*; to spread it somewhat late, towards *Winter*; That the *Sunne* may have the lesse *Power* to drie it up. As for special *Composts* for *Gardens*, (as a *Hot Bed*, &c.) we have handled them before.

569

The Second *Kind* of *Compost*, is, the *Spreading* of divers *Kinds* of *Earth*, As *Marle*, *Chalk*, *Sea-Sand*, *Earth* upon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the best; As having most *Fatnesse*. And not *Heating*

Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Radiment of life. *Chalk* over-heateth the *Ground* a little. And therefore is best upon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour, to think that *Chalk* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grass*, as well as *Corne*: but that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they wear it out with many *Crops*, without Rest; And then (indeed) afterwards it will bear little *Grass*, because the *Ground* is tyred out. It were good to trie the laying of *Chalk* upon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they do the *Tung*; But then it must be Friable first, by Raine, or Lying: As for *Earth*, it *Compasseth* it Self; For I knew a *Great Garden*, that had a *Field* (in a manner) poured upon it; And it did bear *Fruit* excellently the first year of the Planting: For the *Surface* of the *Earth* is ever the *Fruitfullest*. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceive, that such *Earth* as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the *Sunne*, and the Growth of *Vegetables*. And therefore, if you make a large *Hovell*, thatched, over some *Quantity* of *Ground*; Nay, if you do but *Planck* the *Ground* over; it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a very good *Compost*; Especially if the *Pond* have been long uncleaned, and so the *Water* be not too *Hungry*; And I judge it will be yet better, if there be some *Mixture* of *Chalk*.

The Third *Help* of *Ground*, is, by some other *Substances*, that have a Vertue to make *Ground* Fertile; though they be not merely *Earth*: wherein *Ashes* excell; Inasmuch as the Countries about *Aetna*, and *Vesuvius*, have a kind of *Amends* made them, for the Mischiefe the Eruptions (many times) do, by the exceeding *Fruitfullness* of the *Soile*, caused by the *Ashes*, scattered about. *Soot* also, though thinne, spread in a *Field* or *Garden*, is tried to be a very good *Compost*. For *Salt*, it is too Costly; But it is tried, that mingled with *Seed Corne*, and sowed together, it doth good: And I am of Opinion, that *Chalk* in Powder, mingled with *Seed Corn*, would do good; Perhaps as much as *Chalking* the *Ground* all over. As for the *Steeping* of the *Seeds*, in severall *Mixtures* with *Water*, to give them Vigour; Or *Watring* *Grounds* with *Compost-Water*; We have spoken of them before.

The Fourth *Help* of *Ground*, is, the *Suffering* of *Vegetables* to die into the *Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast upon the *Ground*, in the beginning of *Winter*, will make it very *Fruitfull*. It were good (also) to trie, whether *Leaves* of *Trees* swept together, with some *Chalk* and *Dung* mixed, to give them more *Heart*, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lie scattered, and without *Mixture*, they rather make the *Ground* soure, than otherwise.

The Fifth *Help* of *Ground*, is *Heat* and *Warmth*. It hath been anciently practised to burn *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, upon the *Ground*: We see, that *Warmth* of *Wals* and *Enclosures*, mendeth *Ground*: We see also that *Lying open* to the *South*, mendeth *Ground*: We see again, that the *Foldings* of *Sheep* help *Ground*, as well by their *Warmth*, as by their *Compost*: And it may be doubted, whether the *Covering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof we spake in the last *Experiment*), helpeth it not, by reason of the *Warmth*. Nay some very good

Husbands suspect, that the *Gathering* up of *Flints*, in *Flinty Ground* and *Laying* them on *Heaps*, (which is much used) is no good *Husbandry*; For that they would keep the *Ground* Warm.

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The *Sixth Help* of *Ground* is, by *Watering*, and *Irrigation*; which is in two *Manners*: The one by *Letting* in, and *Shutting* out *Waters*, at seasonable *Times*: For *Water*, at some *Seasons*, and with reasonable stay doth good; But at some other *Seasons*, and with too long *Stay*, doth hurt. And this serveth only for *Meadows*, which are along some *River*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it traverse to spread the *Water*. And this maketh an excellent *Improvement*, both for *Corne*, and *Grass*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the *Fatnes* of the *Earth*: But howsoever it profiteth much. Generally, where there are great *Over-flows*, in *Fens*, or the like, the *drowning* of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground* warme, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *Water* may not stay too long in the *Spring*, till the *Weeds* and *Sedge* be grown up; For then the *Ground* will be like a *Wood*, which keepeth out the *Sunne*; And so continueth the *Wet*; Whereby it will never graze (to purpose) that year. Thus much for *Irrigation*. But for *Avoidances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kind, we shall speak of them in another Place.

NATURALL



NATURALL HISTORY.

VII. Century.



He *Differences* between *Animate* and *Inanimate Bodies* we shall handle fully under the *Title of Life*, and *Living Spirits*, and *Powers*: We shall therefore make but a *brief Mention* of them in this Place. The *Main Differences* are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts*, within them: But the *Main Differences* between *Animate* and *Inanimate*, are two: The first is, that the *Spirits of Things Animate*, are all *Continued* with themselves, and are *Branched* in *Veines*, and *secret Canales*, as *Blond* is: And in *Living Creatures*, the *Spirits* have not only *Branches*, but certain *Cels* or *Seats*, where the *Principall Spirits* do reside, and whereunto the rest do resort: But the *Spirits* in *Things Inanimate* are thut in, and cut off by the *Tangible Parts*; And are not *pervious* one to another: As *Air* is in *Snow*. The second *Main Difference* is, that the *Spirits* of *Animate Bodies* are all in some degree, (more or less,) *kindled* and *inflamed*; And have a fine *Commixture* of *Flame*, and an *Aeriall Substance*. But *Inanimate Bodies* have their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* consisteth not in the *Heat* or *Coolness* of *Spirits*; For *Cloves* and other *Spices*, *Naptha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deal than *Oile*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those *Weak* and *Temperate Bodies* come to be *Inflamed*, then they gather a much greater *Heat*, than others have *Uninflamed*; besides their *Light*, and *Motion*, &c.

The *Differences*, which are *secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For look how farre the *Spirit* is able to *Spread* and *Continue* it self; So farre goeth the *Shape* or *Figure*; And then is *Determined*. Secondly, *Plants* do *nourish*; *Inanimate Bodies* do not: They have an *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period* of *Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succession*, and *propagation* of their *Kind*; which is not in *Bodies Inanimate*.

Experiments
in Confort,
touching the
Affinities, and
Differences,
between
Plants and
Inanimate
Bodies.

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The Differences between *Plants*, and *Metals*, or *Fossiles*, besides those four before mentioned, (for *Metals* I hold inanimate,) are these: First, *Metals* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604

There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metals* both; *Corall* is one of the Nearest of both *Kinds*: Another is *Vitrioll*, for that is aptest to sprout with *Moisture*.

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Another speciall *Affinity* is between *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* if it dissolve not in *Arefaction* will in the end issue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Moss*, and *Mushromes* and *Agarick*, and other of those kinds, to be but *Moulds* of the *Ground*, *Wals*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselves, and a Number of other things, after a *Mouldiness*, or *Rottenness*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which have *Affinity* with *Plants*, have this *Difference* from them; That they have no *Succession* or *Propagation*, though they *Nourish*, and have a *Period* of *Life*, and have likewise some *Figure*.

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I left once, by chance, a *Citron* cut, in a close *Roome*, for three *Summermoneths*, that I was absent; And at my *Return*, there were grown forth, out of the *Pith* cut, *Tufts* of *Haires*, an *Inch* long, with little black *Heads*, as if they would have been some *Herb*.

Experiments
in Consort
touching the
Affinities, and
Differences of
Plants, and
Living Crea-
tures. And the
Confines and
Participles of
them.

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THE *Affinities* and *Differences* between *Plants* and *Living Creatures*, are these that follow. They have both of them *Spirits Continued*, and *Branched*, and also *Inflamed*: But first in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was also formerly said. And secondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* do. And these two are the *Radicall Differences*. For the *Secondary Differences*, they are, as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are severed; and of themselves. Secondly, *Living Creatures* have *Locall Motion*; *Plants* have not. Thirdly, *Living Creatures* nourish from their *Upper Parts*; by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Roots*. Fourthly, *Plants* have their *Seed* and *Seminall Parts* uppermost; *Living Creatures* have them lowermost: And therefore it was said, not elegantly alone, but *Philosophically*; *Homo est Planta inver- sa*; *Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* have a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* have more *Diversity* of *Organs* within their *Bodies* and (as it were) *Inward Figures*, than *Plants* have. Seventhly, *Living Creatures* have *Sense*, which *Plants* have not. Eighthly, *Living Creatures* have *Voluntary Motion*, which *Plants* have not.

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For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Piony*, *Female-Piony*; *Male-Rose-mary*, *Female-Rose-mary*; *Hee-Holly*, *Shee-Holly*, &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The nearest *Approach* of it, is between the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow near, incline the one to the other: Infomuch as, (that which is more strange,) they doubt not to report, that to keep the *Trees* upright from *Bending*, they tie *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enjoyed by the *Contact* of a *Middle Body*. But this may be *Fained*, or at least *Amplified*. Nevertheless, I am apt enough to think, that this same *Binarium* of a

Stronger

Stronger and a Weaker, like unto *Masculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Marks* of *Distinction* appear: and it is doubled sometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in most *Species*.

The *Participles* or *Confiners* between *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and have no *Locall Motion* of *Remove*, though they have a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a *Fabulous Narration*, that in the *Northern Countries*, there should be an *Herb* that groweth in the likeness of a *Lamb*, and feedeth upon the *Grass*, in such sort, as it will bear the *Grass* round about. But I suppose that the *Figure* maketh the *Fable*; For so we see, there be *Bee-Flowers*, &c. And as for the *Grass*, it seemeth the *Plant*, having a great *Stalk*, and *Top*, doth prey upon the *Grass* a good way about, by drawing the *Juyce* of the *Earth* from it.

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The *Indian Fig* boweth his *Roots* down so low, in one year, as of it self it taketh *Root* again: And so multiplyeth from *Root* to *Root*; Making of one *Tree* a kind of *Wood*. The *Cause* is, the *Plenty* of the *Sap*, and the *Softness* of the *Stalk*, which maketh the *Bough*, being overloaden, and not stiffely upheld, weigh down. It hath *Leaves*, as broad as a little *Target*, but the *Fruit* no bigger than *Beans*. The *Cause* is, for that the continuall *Shade* increaseth the *Leaves*, and abateth the *Fruit*; which nevertheless is, of a pleasant *Taste*. And that (no doubt) is caused, by the *Suppleness* and *Gentleness* of the *Juyce* of that *Plant*, being that which maketh the *Boughs* also so *Flexible*.

Experiments
Promiscuous
touching
Plants.

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It is reported by one of the *Ancients*, that there is a certain *Indian Tree*; having few, but very great *Leaves*, three *Cubits* long, and two broad; And that the *Fruit* being of good *Taste*, groweth out of the *Barke*. It may be, there be *Plants* that pour out the *Sap* so fast, as they have no leisure, either to divide into many *Leaves*, or to put forth *Stalks* to the *Fruit*. With us *Trees* generally have small *Leaves* in comparifon. The *Fig* hath the greatest; And next it the *Vine*, *Mulberrie*, and *Sycamore*; And the least are those of the *Willow*, *Birch*, and *Thorn*. But there be found *Herbs* with far greater *Leaves* than any *Tree*; As the *Bur*, *Gourd*, *Cucumber*, and *Colewort*. The *Cause* is, (like to that of the *Indian Fig*;) the hasty and plentiful Putting forth of the *Sap*.

611

There be three *Things* in use for *Sweetness*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce known, and little used. It is found in *Canes*: *Quare*, whether to the first *Knuckle*, or further up? And whether the very *Bark* of the *Cane* it self do yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I have heard from one, that was industrious in *Husbandry*, that the labour of the *Bee* is about the *Wax*; And that he hath known in the beginning of *May*, *Honey-Combes* empty of *Honey*, And within a fortnight when the sweet *Dewes* fall, filled like a *Cellar*. It is reported by some of the *Ancients*, that there is a *Tree* called *Ochus*, in the *Valleys* of *Hyrkania*, that distilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Tears* of some *Trees*, may be sweet. It may be also, that some sweet *Juyces*, fit for many uses, may be concocted out of *Fruits*, to the *Thicknets* of *Honey*, or perhaps of *Sugar*; The likeliest are *Rasins* of the *Sun*, *Figs*, and *Corrans*: The *Meanes* may be enquired.

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The *Ancients* report of a *Tree*, by the *Persian Sea*, upon the *Shore-Sands*, which

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which is nourished with the *Salt-Water*; And when the *Tide* ebbeth, you shall see the *Roots*, as it were, bare without *Bark*, (being as it seemeth corroded by the *Salt*;) and grasping the *Sands* like a *Crab*; Which nevertheless beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

614 There be of *Plants*, which they use for *Garments*, these that follow. *Hemp*, *Flax*, *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silk*; They make also *Cables* of the *Bark* of *Lime-Trees*. It is the *Stalk* that maketh the *Filaceous* Matter, commonly; And sometimes the *Down* that groweth above.

615 They have, in some *Countries*, a *Plant* of a *Rosie-Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noon*; which the *Inhabitants* of those *Countries* say, is a *Plant* that *Sleepeth*. There be *Sleepers* enough then; For almost all *Flowers* do the like.

616 Some *Plants* there are, but rare, that have a *Mossie* or *Downie Root*; And likewise that have a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches*, and *Impostours* make an ugly *Image*, giving it the Form of a *Face* at the *Top* of the *Root*, and leave those *Strings* to make a broad *Beard* down to the *Foot*. Also there is a Kind of *Nard*, in *Creet*, (being a Kind of *Phu*) that hath a *Root* hairy, like a *Rough-footed-Doves* foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the Sap hasteneth most to the *Air*, and *Sun*: In the *Fibrous*, the Sap delighteth more in the *Earth*, and therefore putteth downward: And the *Hirsute* is a Middle between both; That besides the Putting forth upwards, and downwards; putteth forth in *Round*.

617 There are some *Tears* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, especially in the *Mornings*, the *Dew* being on, the *Tear* cometh forth, and hangeth upon their *Beards*: Of this Sort is some kind of *Ladanum*.

618 The *Irrigation* of the *Plane-Tree* by *Wine*, is reported by the *Ancients*, to make it *Fruitfull*. It would be tried likewise with *Roots*; For upon *Seeds* it worketh no great *Effects*.

619 The way to carry *Forrein Roots*, a long *Way*, is to vessel them close in *Earthen Vessels*. But if the *Vessels* be not very *Great*, you must make some *Holes* in the *Bottom*, to give some *Refreshment* to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate.

620 The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the *Driest*; And those Things, which are known to comfort other *Plants*, did make that more *Sterill*: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kinds, where commonly *Plants* do not thrive: Neither did it love the *Sun*: There might be one *Cause* of all those *Effects*; Namely, the sparing *Nourishment*, which that *Plant* required. *Quare*, how far *Cassia*, which is now the *Substitute* of *Cinnamon*, doth participate of these Things.

621 It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* do devour the *Pith* and *Marrow* of it, and so make it *Hollow*, But Meddle not with the *Bark*, because to them it is bitter.

622 There were in *Ancient Time*, *Vines*, of farre greater *Bodies*, then we know any; For there have been *Cups* made of them, and an *Image* of *Jupiter*. But it is like they were *Wild-Vines*; For the *Vines* that they use for *Wine*, are so often

often Cut, and so much Digg'd and Dress'd, that their Sap spendeth into the *Grapes*, and so the *Stalk* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twigs*, while they are green, so brittle, yet the *Wood* dried is extreme Tough; And was used by the *Captains* of *Armies* amongst the *Romans*, for their *Cudgels*.

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading upon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make triall, whether *Plants* that use to be born up by Props, will put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Ivie*, *Woodbine*, &c.

Quinces, or *Apples*, &c. if you will keep them long, drown them in *Honey*; But because *Honey* (perhaps) will give them a Taste Over-lushious, it were good to make Triall in *Powder* of *Sugar*; Or in *Syrup* of *Wine* only Boyled to Height. Both these would likewise be tried in *Oranges*, *Limons*, and *Pomegranats*; For the *Powder* of *Sugar*, and *Syrup* of *Wine*, will serve for times more than once.

The *Conservation* of *Fruit* would be also tried in *Vessels*, filled with *Fine Sand*, or with *Powder* of *Chalk*; Or in *Meal* and *Flower*; Or in *Dust* of *Oak-wood*; Or in *Mill*.

Such *Fruits*, as you appoint for *Long-Keeping*, you must gather before they be full *Ripe*; And in a *Fair* and *Dry Day*, towards *Noon*; And when the *Wind* bloweth not *South*: And when the *Moon* is under the *Earth*; And in *Decrease*.

Take *Grapes*, and hang them in an *Empty Vessel*, well Stopped; and set the *Vessel*, not in a *Collar*, but in some drie *Place*; and it is said, they will last long. But it is reported by some, they will keep better, in a *Vessel* half full of *Wine*, so that the *Grapes* touch not the *Wine*.

It is reported, that the *Preserving* of the *Stalk*, helpeth to preserve the *Grape*; Especially if the *Stalk* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

It is reported by some of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let down into *Wells* under *Water*, will keep long.

Of *Herbs* and *Plants*, some are good to eat *Raw*; As *Lettuce*, *Endive*, *Purslane*, *Tarragon*, *Cresses*, *Cucumbers*, *Musk-Melons*, *Radish*, &c. Others only after they are *Boyled*, or have *Passed the Fire*, As *Parsley*, *Clary*, *Sage*, *Parshnips*, *Turnips*, *Asparagus*, *Artichoaks*, (though they also being young are eaten *Raw*;) But a Number of *Herbs* are not *Esculent* at all. As *Wormewood*, *Grass*, *Green-Corn*, *Centory*, *Hyslope*, *Lavender*, *Balm*, &c. The *Causes* are, for that the *Herbs* that are not *Esculent*, do want the two *Tastes*, in which *Nourishment* resteth; Which are, *Fat*, and *Sweet*; And have (contrariwise) *Bitter*, and *Over-strong Tastes*, or a *Juyce* so crude, as cannot be ripened to the degree of *Nourishment*. *Herbs*, and *Plants*, that are *Esculent Raw*, have *Fatness*, or *Sweetness*, (as all *Esculent Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it must be such a *Fatness*, (for as for *Sweet Things*, they are in effect alwayes *Esculent*) as is not *Over-gross*, and *Loading* of the *Stomack*; For *Parshnips* and *Leeks* have *Fatness*; But it is too *Gross* and *Heavy* without *Boyling*. It must be also in a *Substance* somewhat *Tender*; For we see *Wheat*, *Barley*, *Artichoaks*, are no good *Nourishment*, till they have passed the *Fire*; But the *Fire* doth ripen, and maketh them soft and tender, and so they become *Esculent*. As for *Radish*, and *Tarragon*, and the like, they are for *Condiments*, and not for *Nourishment*. And even some of those *Herbs*, which are not *Esculent*

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lent, are notwithstanding *Poculent*; As *Hops, Broom, &c.* *Quare* what *Herbs* are good for *Drink*, besides the two aforementioned; For that it may (perhaps) ease the Charge of *Brewing*, if they make *Beer* to require less *Malt*, or make it last longer.

631 *Parts* fit for the *Nourishment* of *Man*, in *Plants*, are *Seeds, Roots, and Fruits*; But chiefly *Seeds, and Roots*. For *Leaves*, they give no *Nourishment* at all, or very little: No more do *Flowers, or Blossomes, or Stalkes*. The Reason is, for that *Roots, and Seeds, and Fruits*, (inasmuch as all *Plants* consist of an *Oily* and *Watric* Substance commixed,) have more of the *Oily Substance*, And *Leaves, Flowers, &c.* of the *Watric*. And secondly, they are more *Concocted*; For the *Root*, which continueth ever in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits, and Grains*, (we see) are half a year, or more, in *Concocting*; Whereas *Leaves* are out, and *Perfect* in a Month.

632 *Plants*, (for the most part) are more strong, both in *Taste* and *Smell*, in the *Seed*, than in the *Leaf* and *Root*. The *Cause* is, for that in *Plants* that are not of a *Fierce* and *Eager Spirit*, the *Virtue* is encreased by *Concoction*, and *Maturation*, which is ever most in the *Seed*; But in *Plants* that are of a *Fierce* and *Eager Spirit*, they are stronger whilest the *Spirit* is inclosed in the *Root*; And the *Spirits* do but weaken, and dissipate, when they come to the *Air* and *Sunne*; As we see it in *Onions, Garlick, Dragon, &c.* Nay there be *Plants* that have their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Inspide*; As *Ginger*. The *Cause* is, (as was touched before,) for that the *Heat* of those *Plants* is very *Diffipable*, which under the *Earth* is contained and held in; But when it cometh to the *Air*, it exhalet.

633 The *Fuyces* of *Fruits* are either *Watric*, or *Oylie*. I reckon amongst the *Watric*, all the *Fruits* out of which *Drink* is expressed; As the *Grape*, the *Apple*, the *Pear*, the *Cherry*, the *Pomegranate*, &c. And there are some others, which though they be not in use for *Drink*, yet they appear to be of the same *Nature*; As *Plums, Services, Mulberries, Rapps, Oranges, Limons, &c.* And for those *Fuyces*, that are so fleshy, as they cannot make *Drink* by *Expression*, yet (perhaps) they may make *Drink* by *Mixture* of *Water*;

Poculaque admistis imitantur vitea Sorbis.

And it may be *Heps* and *Brier-Berries* would do the like. Those that have *Oylie Fuyces*, are; *Olives, Almonds, Nuts* of all sorts, *Pine-Apples, &c.* And their *Fuyces* are all *Inflammable*. And you must observe also, that some of the *Watric Fuyces*, after they have gathered *Spirit*, will *Burn* and *Enflame*; As *Wine*. There is a *Third Kind* of *Fruit*, that is sweet, without either *Sharpness* or *Oylinefs*: Such as is the *Fig*, and the *Date*.

634 It hath been noted, that most *Trees*, and specially those that bear *Mast*, are fruitfull but once in two yeares. The *Cause* (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well *Cultured*, will bear divers yeares together.

635 There is no *Tree*, which besides the *Naturall Fruit*, doth bear so many *Bastard Fruits*, as the *Oake* doth; For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certain *Oake-Nuts*, which are *Inflammable*; And certain *Oake-Berries*, sticking close to the *Body* of the *Tree* without *Stalk*. It beareth also *Missetoe*, though rarely. The *Cause* of all these may be, the *Closeness* and *Solidness* of the *Wood*, and *Pith* of the *Oake*; Which maketh severall *Fuyces* find severall *Erptions*. And therefore, if you will devise to make any *Super-Plants*, you must ever give the *Sap* *Plentifull Rising*, and *Hard Issue*.

There

There are two *Excrefcences*, which grow upon *Trees*; Both of them in the Nature of *Mushromes*: The one the *Romans* called *Boletus*; Which groweth upon the *Roots* of *Oaks*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agarick*, (whereof we have spoken before,) which groweth upon the *Tops* of *Oakes*; Though it be affirmed by some, that it groweth also at the *Roots*. I do conceive, that many *Excrefcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into some *Prenaturall Substance*.

636

The greater part of *Trees* bear *Moss*, and *Best*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But some bear *Best* on the *Top-Boughs*; As *Crabs*, &c. Those that bear *best* below, are such, as *Shade* doth more good to than *Hurt*. For generally all *Fruits* bear *best* lowest; Because the *Sap* itreth not, having but a short *Way*: And therefore in *Fruits* spread upon *Walls*, the *Lowest* are the *Greatest*, as was formerly said; So it is the *Shade* that hindereth the *Lower-Boughs*; Except it be in such *Trees*, as delight in *Shade*; Or at least bear it well. And therefore, they are either *Strong Trees* as the *Oak*; Or else they have large *Leaves*, as the *Walnut* and *Fig*; Or else, they grow in *Pyramis*, as the *Pear*. But if they require very much *Sun*, they bear *best* on the *Top*; as it is *Crabs*, *Apples*, *Plums*, &c.

637

There be *Trees*, that bear *best*, when they begin to be *old*; As *Almonds*, *Peares*, *Vines*, and all *Trees*, that give *Mast*. The *Cause* is, for that all *Trees*, that bear *Mast*, have an *Oily Fruit*; And *Young Trees*, have a more *Watry Juice*, and less *Concocted*; And of the same kind also is the *Almond*. The *Pear* likewise, though it be not *Oylie*, yet it requireth much *Sap*, and well *Concocted*: For we see it is a *Heavie Fruit* and *Solid*; Much more than *Apples*, *Plums*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *old*; For that the *Juice* is better *Concocted*: And we see, that *Wine* is *Inflammable*; So as it hath a kind of *Oylinefs*. But the most Part of *Trees*, amongst which are *Apples*, *Plums*, &c. bear *best* when they are *Young*.

638

There be *Plants*, that have a *Milk* in them, when they are *Cut*; As *Figs*, *Old-Lettuce*; *Sow-Thistles*, *Spurge*, &c. The *Cause* may be an *Inception* of *Putrefaction*; For those *Milks* have all an *Acrimony*; Though one would think they should be *Lenitive*. For if you write upon *Paper*, with the *Milk* of the *Fig*, the *Letters* will not be seen, until you hold the *Paper* before the *Fire*, and then they wax *Brown*; which sheweth that it is a *Sharp* or *Fretting Juice*: *Lettuce* is thought *Poysonous*. when it is so *old*, as to have *Milk*; *Spurge* is a kind of *Poyson* in it *Self*; And as for *Sow-Thistles*, though *Coneys* eat them, yet *Sheep* and *Cattel* will not touch them; And besides, the *Milk* of them, rubbed upon *Warts*, in short time, weareth them away: Which sheweth the *Milk* of them to be *Corrosive*. We see also, that *Wheat*, and other *Co n sown*, if you take them forth of the *Ground*, before they *iprou*t, are full of *Milk*; And the *Beginning* of *Germination* is ever a Kind of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milk*, though not very *white*, which is of a great *Acrimony*. And *Saladino* hath a *yellow Milk*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

639

Mushromes are reported to grow, as well upon the *Bodies* of *Trees*, as upon their *Roots*, or upon the *Earth*: And especially upon the *Oak*. The *Cause* is, for that *strong Trees* are towards such *Excrefcences*, in the Nature of *Earth*; And therefore put forth *Moss*; *Mushromes*, and the like.

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There is hardly found a *Plant*, that yeeldeth a *Red Fuyce*, in the *Blade*, or *Ear*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth chiefly in the *Island Soquotra*: The *Herb Aramanthus*, (indeed,) is *Red* all over; And *Brasil* is *Red* in the *Wood*: And so is *Red Sanders*. The *Tree* of *Sanguis Draconis*, groweth in the form of a *Sugar-Loaf*. It is like, the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For we see that *Grapes*, and *Pomegranates*, are *Red* in the *Fuyce*, but are *Green* in the *Tear*: And this maketh the *Tree* of *Sanguis Draconis* lesser towards the *Top*; Because the *Fuyce* hasteneth not up; And besides, it is very *Astringent*; And therefore of *Slow Motion*.

642

It is reported, that *Sweet Moss*, besides that upon the *Apple Trees*, groweth likewise (sometimes) upon *Poplars*; And yet (generally) the *Poplar* is a *Smooth Tree* of *Bark*, and hath little *Moss*. The *Moss* of the *Larix-Tree* burneth also sweet, and sparkleth in the *Burning*. *Quare* of the *Mosses* of *Odorate Trees*, As *Cedar*, *Cypress*, *Lignum Aloes*, &c.

643

The *Death* that is most without *Pain*, hath been noted to be, upon the *Taking* of the *Potion* of *Hemlock*; which in *Humanity* was the *Form* of *Execution* of *Capital Offenders* in *Athens*. The *Poysson* of the *Aspe*, that *Cleopatra* used, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the *Strife* of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme *Old Man*. I conceive it is leis painfull then *Opium*, because *Opium* hath *Parts* of *Heat* mixed.

644

There be *Fruits*, that are *Sweet* before they *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are *Sweet* before they ripen, and after grow *Spicy*. And some never *Ripen* to be *Sweet*; As *Tamarinds*, *Barberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former *Kind* have much and *subtile Heat*, which causeth *Early Sweetness*; The latter have a *Cold* and *Acide Fuyce*; which no *Heat* of the *Sun* can sweeten. But as for the *Mirabolane*, it hath *Parts* of *Contrary Natures*; For it is *Sweet* and *Astringent*.

645

There be few *Herbs* that have a *Salt Taste*; And contrariwise all *Bloud* of *Living Creatures* hath a *Saltness*: The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the *Originall Taste* remaineth not; For you shall have them *Bitter*, *Soure*, *Sweet*, *Biting*, but seldom *Salt*: But in *Living Creatures*, all those *High Tastes* may happen to be (sometimes) in the *Humours*, but are seldom in the *Flesh*, or *Substance*; Because it is of a more *Oily Nature*; which is not very *Sulceptible* of those *Tastes*; And the *Saltness* it self of *Bloud*, is but a *light*, and *secret Saltness*: And even among *Plants*, some do participate of *Saltness*, as *Alga Marina*, *Samphire*, *Scorvy-Grass*, &c. And they report, there is, in some of the *Indian Seas*, a *Swimming Plant*, which they call *Salgazus*, spreading over the *Sea*, in such sort, as one would think it were a *Meadow*. It is certain, that out of the *Ashes*, of all *Plants*, they extract a *Salt*, which they use in *Medicines*.

646

It is reported by one of the *Ancients*, that there is an *Herb* growing in the *Water*, called *Lincostis*, which is full of *Prickles*: This *Herb* putteth forth another small *Herb* out of the *Leaf*; which is imputed to some *Moisture*, that is gathered between the *Prickles*, which *Putrified* by the *Sun*, *Germi*nateth. But I remember also I have seen, for a great *Rarity*, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

647

Barley, (as appeareth in the *Malting*), being steeped in *Water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned upon a *drie* soar, will sprout, half an *Inch* long at least: And if it be let alone, and

not

not turned, much more; untill the Heart be out. *Wheat* will doe the same. Trie it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-vive*; For there it is of the old Store, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driven: For it appeareth already, by that which hath been said, that *Earth*, is not necessary to the first Sprouting of *Plants*; And we see that *Rose-Buds* set in *Water*, will blow: Therefore trie whether the *Sprouts* of such *Graines* may not be raised to a further Degree; As to an *Herb*, or *Flower*, with *Water* onely; Or some small commixture, of *Earth*: For if they will, it should seem by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come farre faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawn out of *Water*, than out of *Earth*. It may giue some light also, that *Drink* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drink* together. Trie the same *Experiment* with *Roots*, as well as with *Graines*: As for Example, take a *Turnip*, and steep it a while, and then drie it, and see whether it will sprout.

Malt in the *Drenching* will swell; And that in such a manner, as after the Putting forth in *Sprouts*, and the drying upon the *Keele*, there will be gained at least a Bushel in eight, and yet the *Sprouts* are rubbed off; And there will be a Bushel of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open Laying of the *Parts*, but by some Addition of *Substance*, drawn from the *Water*, in which it was steeped.

Malt gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in the *Wort*. The *Dulcoration* of *Things* is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of *Things* *Inalmental*, to become *Alimental*, may be an *Experiment* of great Profit, for Making new *Viſual*.

Most *Seeds* in the Growing, leave their *Husk* or *Rind* about the *Root*; But the *Onion* will carry it up, that it will be like a *Cap* upon the *Top* of the *Young Onion*. The *Cause* maybe, for that the *Skin* or *Husk* is not easie to break; as we see by the Pilling of *Onions*, what a holding *Substance* the *Skin* is.

Plants, that have *Curled Leaves*, doe all abound with *Moisture*; Which commeth so fast on, as they cannot spread themselves Plain, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*, As in *Clary*, and *Burre*. The Second is *Curling* on the *Sides*; As in *Lettuce*, and *Young Cabbage*: And the Third is folding into an *Head*; As in *Cabbage* full grown and *Cabbage Lettuce*.

It is reported, that *Firre*, and *Pines*, especially if they be *Old* and *Putrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like *Hard Sugar*.

The *Roots* of *Trees* doe, (some of them,) put down-wards deep into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Ash*, *Cypresse-Tree*, *Olive*, &c. The *Cause* of this latter may be, for that such *Trees* as love the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot up much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, under *Ground*, to avoid Reces from the *Sunne*, maketh them spread the more. And we see it cometh to passe in some *Trees*, which have been planted too deep in the *Ground*, that for love of Approach to the *Sunne* they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And we see also that the *Olive* is full of *Cily Juice*; And *Ash* maketh the best *Fire*; And

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Cypresse is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loveth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they have so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that have the same difference; As the *Herb* they call *Morsus Diaboli*; which putteth the *Root down* so low, as you cannot pull it up without *Breaking*; Which gave Occasion to the *Name*, and *Fable*; For that it was said, it was so wholsome a *Root*, that the *Devil*, when it was gathered, bit it for *Envy*, and some of the *Ancients* doe report, that there was a goodly *Firre*, (which they desired to remove whole) that had a *Root* under *Ground* eight Cubits deep; And so the *Root* came up broken.

654 It hath been observed, that a *Branch* of a *Tree*, being *Un-barked* some space at the *Bottom*, and so set into the *Ground*, hath grown; even of such *Trees*, as if the *Branch* were set with the *Bark* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, above *Ground*, will die. The *Cause* may be, for that the *Unbarkt Part* draweth the *Nourishment* best, but the *Barke* continueth it onely.

655 *Grapes* will continue *Fresh*, and *Moist*, all *Winter* long, if you hang them, *Cluster* by *Cluster*, in the *Roofe* of a *Warme Room*; Especially, if when you gather the *Cluster* you take of with the *Cluster* some of the *Stock*.

656 The *Reed* or *Cane* is a *Watry Plant*; and groweth not but in the *Water*; It hath these *Properties*; That it is *Hollow*; That it is *Knuckled*, both *Stalk*, and *Root*, that being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughs*, though many *Stalks* out of one *Reot*. It differeth much in greatnesse, The smallest being fit for *Thatching* of *Houses*; And *Stopping* the *Chinks* of *Ships*; Better than *Glew*, or *Pitch*. The *Second Bignesse*, is used for *Angle-Rods*, and *Staves*; And in *China* for beating of *Offenders* upon the *Thighs*. The differing *Kinds* of them are; The *Common Reed*, The *Cassia Fistula*, And the *Sugar-Reed*. Of all *Plants* it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most *Nourishment* from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hollowest* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watry* and *Clear*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thick*; As *Apples*: Some *Gummy*, As *Cherries*. Some *Froathy*; As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* onely; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole* it will be *drie*. The *Trees*, which have the *Moistest Juices* in their *Fruit*, have commonly the *Moistest Sap* in their *Body*; For the *Vines* and *Peares* are very *Moist*; *Apples* somewhat more *Sponie*: The *Milk* of the *Figg* hath the *Quality* of the *Rennet*, to gather *Cheese*: And so have certaine *Soure Herbs* wherewith they make *Cheese* in *Lent*.

658 The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*; And it is a good *Trial*, to trie it by *Speaking* at one *End*, and *Laying* the *Eare* at the *Other*: For if it be *Knottie*, the *Voice* will not passe well. Some have the *Veines* more varied and *Chamloted*; As *Oake*, whereof *Wain-scot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre* and *Wal-nut*: Some doe more easily breed *Wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*: Besides there be a *Number* of *Differences* that concerne their *Use*; As *Oake*, *Cedar*, and *Chest-nut*, are the

the best Builders : Some are best for *Plough-Timber* ; As *Asb* ; Some for *Peers* , that are some-times wet and some-times dry ; As *Elme* : Some for *Planchers* ; As *Deale* : Some for *Tables, Cup-boards,* and *Deskes* ; As *Wal-nuts* : Some for *Ship-Timber* ; As *Oakes* that grow in *Moist Grounds* ; For that maketh the *Timber Tough*, and not apt to rift with *Ordnanee* ; Wherein *Englisch* and *Irisb Timber* are thought to excell : Some for *Masts of Ships* ; As *Firre* and *Pine*, because of their Length, Straightnesse, and Lightnesse : Some for *Pale* ; As *Oake* : Some for *Fuell* ; As *Asb* : And so of the rest.

The *Comming of Trees* and *Plants* in certain *Regions* , and not in others, is some-times *Casual* : For many have been translated, and have prospered well ; As *Damaske Roses* , that have not been knowne in *England* above an hundred yeares , and now are so common. But the liking of *Plants* in certain *Soiles* , more than in others , is meerly *Natural* ; As the *Firre* and *Pine* love the *Mountaines* ; The *Poplar, Willow, Sallow,* and *Alder* , love *Rivers*, and *Moist Places* : The *Asb* loveth *Coppices* ; But is best in *Standards* alone : *Juniper* loveth *Chalke* ; And so doe most *Fruit-Trees* : *Sampire* groweth but upon *Rockes* : *Reeds* and *Osiers* grow where they are washed with *Winter* : The *Vine* loveth *Sides .of Hills* , turning upon the *South-East Sun*, &c.

659

The *Putting forth* of certain *Herbs* discovereth of what *Nature* the *Ground* where they put forth, is : As *Wilde Thyme* sheweth good *Feeding-Ground* for *Cattell* : *Betony* and *Strawberries* sheweth *Grounds* fit for *Wood* : *Camomill* sheweth *Mellow Grounds* fit for *Wheat, Mustard-Seed*, growing after the *Plough* , sheweth a good *Strong Ground* also for *Wheat* : *Burnet* sheweth good *Meadow* : And the like.

660

There are found , in divers *Countries* , some other *Plants* that grow out of *Trees* , and *Plants*, besides *Missel-toe* : As in *Syria*, there is an *Herb* called *Cassias* , that groweth out of tall *Trees* , and windeth it self about the same *Tree* where it groweth ; And some-times about *Thorns*. There is a kinde of *Polyode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herb* called *Faunos*, upon the *Wilde Olive*. And an *Herb* called *Hippophaeston* upon the *Fullers Thorn* ; Which, they say, is good for the *Falling Sicknes*.

661

It hath been observed, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds*, are thought to be great *Enemies* to *Fruit* ; yet neverthelesse *South-winds* are also found to do *Hurt* ; Especially in the *Blossoming* time ; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West-Winds* are the best. It hath been observed also, that *Green* and *Open Winters* do hurt *Trees* ; Infomuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will die. The *Cause* is the same with the former, because the *Lust* of the *Earth* over-spendeth it self ; Howsoever some other of the *Ancients* have commended *Warm Winters*.

662

Snowes, lying long, cause a *Fruitfull Yeare* ; For first, they keep in the *Strength* of the *Earth* ; Secondly, they water the *Earth*, better than *Rain* ; For in *Snow*, the *Earth* doth (as it were) suck the *Water* , as out of the *Teat*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture* ; For it is the *Froth* of the *Cloudy Waters*.

663

Showers, if they come a little before the *Ripening* of *Fruits* , do good to all *Succulent* and *Moist Fruits* ; As *Vines, Olives, Pomegranates* ; Yet it is rather for *Plenty* , than for *Goodnesse* ; For the best *Wines* are in the *Driest Vintages* : *Small Showers* are likewise good for *Corne* , so as *Parching Heats* come not upon them. Generally, *Night>Showers* are better than *Day-*

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Showers; For that the *Sunne* followeth not so fast upon them: and we see, even in *Watering* by the *Hand*, it is best, in *Summer-time*, to water in the *Evening*.

665

The *Differences* of *Earths*, and the *Trials* of them, are worthy to be diligently enquired. The *Earth*, that with *Showers* doth easily *Soften*, is commended; And yet some *Earth* of that kinde will be very *Dry*, and *Hard* before the *Showers*. The *Earth* that casteth up from the *Plough*, a great *Clod*, is not so good, as that, which casteth up a *Smaller Clod*. The *Earth*, that putteth forth *Moss* easily, and may be called *Mouldy*, is not good. The *Earth*, that smelleth well upon the *Digging*, or *Ploughing*, is commended; As containing the *Juyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Rain-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well be; For that the *Earth* is most *Rosicide*: And therefore it is commended for a *Signe* of good *Earth*. The *Poorneß* of the *Herbs*, (it is plain,) sheweth the *Poorneß* of the *Earth*; And especially if they be in *Colour* more dark; But if the *Herbs* shew *Withered*, or *Blasted* at the *Top*, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossineß* of *Trees*. The *Earth*, whereof the *Grasse* is soon *Parched* with the *Sun*, and *Toasted*, is commonly *Forced Earth*, and *Barren* in his own *Nature*. The *Tender*, *Cheffome*, and *Mellow Earth*, is the best; Being meer *Mould*, between the two *Extreams* of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Rain*, will scarce be *Ploughed*, is commonly *Fruitful*; For it is *Clearing*, and full of *Juyce*.

666

It is strange, which is observed by some of the *Ancients*, that *Dust* helpeth the *Fruitfulneß* of *Trees*; and of *Vines*, by name: Inasmuch as they cast *Dust* upon them of purpose: It should seem, that that *Powdring*, when a *Shower* commeth, maketh a kinde of *Soyling* to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that *Countries*, where the *Fields* and *Wayes* are *Dusty*, bear the best *Vines*.

667

It is commended by the *Ancients*, for an *Excellent Help* to *Trees*, to lay the *Stalks*, and *Leaves* of *Lupines* about the *Roots*; Or to *Plough* them into the *Ground*, where you will sow *Corn*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them upon *Land*, doth much *Good*. And it was generally received of old, that *Dunging* of *Grounds*, when the *West-winde* bloweth, and in the *Decrease* of the *Moon*, doth greatly help; The *Earth* (as it seemeth) being then more *thirsty*, and open to receive the *Dung*.

668

The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in use: The *Ancients* had it, and that three wayes: The first was *In-sition*, which is the *Ordinary* manner of *Grafting*: The second was *Terebration*, through the *Middle* of the *Stem*, and putting in the *Gions* there: And the third was *Paring* of two *Vines*, that grow together, to the *Marrow*, and *Binding* them close.

669

The *Diseases* and ill *Accidents* of *Corn*, are worthy to be enquired; And would be more worthy to be enquired, if it were in *Mens Power* to help them; Whereas many of them are not to be remedied. The *Mil-dew* is one of the *Greatest*; which (out of question) commeth by *Clofenesse* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldom commeth; Such as is with us *York's Wood*. This cannot be remedied, otherwise than that in *Countries* of small *Enclosure*, the *Grounds* be turned into larger *Fields*: Which I have knowne to doe good in some *Farmes*. Another *Disease* is the *Putting forth* of *Wilde Oais*, whereinto *Corn* oftentimes, (especially *Barley*,) doth degenerate. It happeneth chiefly from the

the *Weankeſſ* of the *Grain* that is ſowen ; For if it be either too Old , or Mouldy, it will bring forth *Wilde Oats*. Another *Disease* is the *Society* of the *Ground* ; For if you ſowe one *Ground* ſtill with the ſame *Corn* (I mean not the ſame *Corn* that grew upon the ſame *Ground* ,) but the ſame *Kinde* of *Grain* ; (As *Wheat*, *Barley* , &c.) it will proſper but poorly : Therefore beſides the *Reſting* of the *Ground*, you muſt vary the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times ; At the *Flouring*, by *Shaking* off the *Flowers* ; And at the full *Ripening*, by *Shaking* out the *Corn*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corn* ; Which with us rare ; But in *Hotter Countries*, common : Infomuch as the Word, *Calamitas*, was firſt derived from *Calamus* , when the *Corn* could not get out of the *Stalke*. Another ill *Accident* is, *Over-Wet* at *Sowing-Time* ; which with us breedeth much *Dearth* ; Infomuch as the *Corne* never cometh up ; And (many times) they are forced to re-ſow *Summer-Corne* , where they ſowed *Winter-Corne*. Another ill *Accident* is *Bitter Froſts*, continued, without *Snow* ; Eſpecially in the Beginning of the *Winter*, after the *Seed* is new *Sowen*. Another *Disease* is *Wormes* ; which ſometimes breed in the *Root*, and happen upon *Hot Suns*, and *Showers*, immediately after the *Sowing* ; And another *Worme* breedeth in the *Eare* it Selfe ; Eſpecially, when *Hot Sunnes* breake often out of *Clouds*. Another *Disease* is *Weeds*, And they are ſuch , as either *Choak*, and *Over-shadow* the *Corne*, and beare it down ; Or ſtarve the *Corne*, and deceive it of *Nouriſhment*. Another *Disease* is, *Over-Rankneſſe* of the *Corne*, Which they uſe to remedy, by *Mowing* it after it is come up ; Or putting *Sheep* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neer or in *Harveſt*. Another ill *Accident* is, if the *Seed* happen to have touched *Oile*, or any *Thing*, that is *Fat* ; For thoſe *Subſtances* have an *Antipathy* with *Nouriſhment* of *Water*.

The *Remedies* of the *Diseaſes* of *Corne* have been obſeved as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preſervative*: The *Mingling* of *Seed-Corne* with *Aſhes*, is thought to be good: The *Sowing* at the *Wane* of the *Moon*: is thought to make the *Corne* ſound : It hath not been practiſed , but it is thought to be of uſe , to make ſome *Miſſellane* in *Corne*, Aſif you ſow a few *Beanes* with *Wheat* , your *Wheat* will be the better. It hath been obſerved, that the *Sowing* of *Corne* with *Houſleek*, doth good. Though *Graine*, that toucheth *Oile*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oile*, when it beginneth to *Putriſie*, (which they call *Amurca*), is thought to aſſure it againſt *Wormes*. it is reported alſo, that if *Corne* be *Moved*, it will make the *Graine* Longer, but *Empri-*er, and having more of the *Huſke*.

It hath been noted, that *Seed* of a year old, is the Beſt ; And of two or three yeares is worſe ; And that which is more Old , is quite *Barren* ; Though (no doubt) ſome *Seed* and *Graines* laſt better than others. The *Corne*, which in the *Vanning* lieth loweſt, is the beſt : And the *Corne*, which broken or bitten retaineth a little *Yellowneſſe*, is better than that which is very *White*.

It hath been obſerved, that of all *Roots* of *Herbs*, the *Root* of *Sorrel* goeth the furtheſt into the *Earth* ; Infomuch as it hath been known to goe three Cubits deep ; And that it is the *Root* that continueth fit (longeſt) to be ſet againe, of any *Root* that groweth. It is a *Cold*, and *Acide Herb*, that (as it ſeemeth) loveth the *Earth*, and is not much drawn by the *Sunne*.

It hath been obſerved , that ſome *Herbs* like beſt , being warred with *Salt-Water* ; And *Radish*, *Beet*, *Rew*, *Pennyroyal* ; This *Trial* would be extended

670

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673

to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674

It is strange, that it is generally received, how some *Poysonous Beasts* affect *Odorate* and *wholsome Herbs*; As that the *Snake* loveth *Fennel*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other *Coverture*, that they take liking in, than the *Vertue* of the *Herb*.

675

It were a Matter of great Profit, (save that I doubt it is too *Conjectural* to venture upon,) if one could discern, what *Corn*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the Year: For as for those, that are like to be in *Plenty* they may be bargained for, upon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when he fore-saw a great *Plenty* of *Oliues*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the Old Store. Long *Continuance* of *Snow* is believed to make a *Fruitful Year* of *Corn*: An *Early Winter* or a very *Late Winter*, a *Barren Year* of *Corn*: An *Open* and *Serene Winter*, an ill Year of *Fruit*: These we have partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676

There seem to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Olive* hath the *Oily Part*, onely on the *Out-side*; Whereas all other *Fruits* have it in the *Nut* or *Kernel*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernel*; Except you will count the little *Graines*, *Kernels*. The *Pomegranate* and *Pine-Apple* have onely, amongst *Fruits*, *Graines* distinct in severall *Cels*. No *Herbs* have *Curled Leaves*, but *Cabbage*, and *Cabbage-Lettuce*. None have double *Leaves*, one belonging to the *Stalk*, another to the *Fruit* or *Seed*, but the *Artichoake*: No *Flower* hath that kind of *Spread* that the *wood-bine* hath. This may be a large *Field* of *Contemplation*; For it sheweth that in the *Frame* of *Nature*, there is, in the *Producing* of some *Species*, a *Composition* of *Matter*, which hapneth oft, and may be much diversified: In others, such as happeneth rarely, and admitteth little *Variety*: for so it is likewise in *Beasts*: *Dogs* have a re-semblance with *wolves*, and *Foxes*; *Horses* with *Asses*, *Kine* with *Busies*; *Hares* with *Coneys*, &c. And so in *Birds*: *Kites* and *Kestrels* have a Resemblance with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black Birds* with *Thrushes*, and *Mavisses*; *Crowes* with *Ravens*, *Dames*, and *Choughs*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird* of *Paradise*, and the *Peacock* amongst *Birds*; And some few others; have scarce any other *Species*, that have *Affinity* with them.

We leave the *Description* of *Plants*, and their *Vertues* to *Herbals*, and other like *Books* of *Natural History*: Wherein *Mens Diligence* hath been great, even to *Cuirosity*: For our *Experiments* are onely such, as do ever ascend a *Degree* to the *Deriving* of *Causes*, and *Extracting* of *Axiomes*, which, we are not ignorant, but that some, both of the *Ancient*, and *Modern Writers*, have also laboured; But their *Causes*, and *Axiomes*, are so full of *Imagination*, and so infected with the old Received *Theorie*, as they are meer *Inquinations* of *Experience*, and *Concoct* it not.

IT hath been observed, by some of the *Ancients*, that *Skins*, (especially of *Rams* newly pulled off, and applied to the *Wounds* of *Stripes*, doe keep them from Swelling, and Exulcerating; And likewise Heal them, and Close them up; And that the *Whites* of *Eggs* doe the same. The *Cause* is, a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viscous, and do bridle the *Deflux* of *Humors* to the *Hurts*, without Penning them in too much.

Experiment
Solitary
touching
Healing
of Wounds.

677

YOU may turn (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into *Pieces*, and put the *Pieces* into a *Glasse* covered with *Parchment*; And so let the *Glasse* stand six or seven *Hours* in *Boyling Water*. It may be an *Experiment* of Profit, for making of *Fat* or *Grease*, for many uses, But then it must be of such *Flesh* as is not *Edible*; As *Horses*, *Dogs*, *Bears*, *Foxes*, *Badgers*, &c.

Experiment
Solitary
touching
Fat
dissolved
in
Flesh.

678

IT is reported by one of the *Ancients*, that *New Wine*, put into *Vessels* well stopp'd, and the *Vessels* let down into the *Sea*, will accelerate very much, The making of them *Ripe*, and *Potable*. The same would be tried in *Wort*.

Experiment
Solitary
touching
Ripening
of
Drink
before
the
Time.

679

Experiment
Solitary
touching
Pilosity
and
Plumage.

680

BEASTS are more *Hairy* than *Men*; And *Savage Men* more than *Civil*; And the *Plumage* of *Birds* exceedeth the *Pilosity* of *Beasts*. The *Cause* of the Smoothness in *Mens*, is not any *Abundance* of *Heat*, and *Moisture*, though that indeed causeth *Pilosity*; But there is requisite to *Pilosity*, not so much *Heat* and *Moisture*, as *Excrementitious Heat* and *Moisture*: For whatsoever assimilateth goeth not into the *Hair*: And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Savage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and excern more than *Beasts*, for their *Excrements* are ever liquid, and their *Flesh*, (generally more drie: Beside, they have not *Instruments* for *Urine*, And so all the *Excrementitious Moisture* goeth into the *Feathers*: And therefore it is no *Marvel*, though *Birds* be commonly better *Meat* than *Beasts*, because their *Flesh* doth assimilate more finely, and se-cerneth more subtilly. Again, the *Head* of *Man* hath *Hair* upon the *first Birth*, which no other *Part* of the *Body* hath. The *Cause* may be *Want* of *Perspiration*: For Much of the *Matter* of *Haire*, in the other *Parts* of the *Body*, goeth forth by *Insensible Perspiration*; And besides, the *Skull* being of a more solid *Substance*, nourisheth and assimilateth lesse, and ex-cerneth more: And so likewise doth the *Chin*; We see also that *Hair* commeth not upon the *Palms* of the *Hands*, nor *Soles* of the *Feet*; Which are *Parts* more *Perspirable*. And *Children* likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiment
Solitary
touching
the
Quickness
of
Motion
in
Birds.

681

BIRDS are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beasts*. The *Cause* is, for that the *Spirits* in *Birds*, are in greater *Proportion*, in comparison of the *Bulk* of their *Body*, than in *Beasts*: For as for the *Reason* that some give, that they are partly *Carried*, whereas *Beasts* go, that is *Nothing*; For by that *Reason* *Swimming* should be *swifter*, than *Running*: And that *Kind* of *Carriage* also, is not without *Labour* of the *Wing*.

Experiment
Solitary
touching
the
different
Clearness
of
the
Sea.

682

THE *Sea* is *Clearer*, when the *North-Wind* bloweth, than when the *South-Wind*. The *Cause* is, for that *Salt-Water* hath a little *Oiliness* in the *Surface* thereof, As appeareth in very *Hot Dayes*: And again, for that the *Southern*

Southern-Wind relaxeth the *Water* somewhat; As no *Water Boiling* is so clear as *Cold Water*.

Experiment
Solitary touch-
ing the dif-
ferent Heats of
Fire and *Boil-
ing Water*.

683

Fire burneth *Wood*, making it first *Luminous*; Then *Black* and *Brittle*; And lastly, *Broken* and *Incinerate*: *Scalding Water* doth none of these. The *Cause* is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and then *Emitted*; Whereof the *Refining*, or *Attenuation* causeth the *Light*; And the *Emission*, first, the *Fragility*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides Part of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguish it: Therefore wee see that *Hot Water* will quench *Fire*. And, again, we see that in *Bodies* wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Eggs Boiled* and *Roasted*, (into which the *Water* entreth not at all, there is scarce difference to be discerned; But in *Fruit*, and *Fleish*, whereinto the *Water* entreth, in some Part, there is much more difference.

Experiment
Solitary touch-
ing the
Qualification
of Heat by
Moisture.

684

The *Bottom* of a *Vessel* of *Boiling Water*, (as hath been observed,) is not very much *Heated*, So as men may put their hand under the *Vessel*, and remove it. The *Cause* is, for that the *Moisture* of *Water*, as it quençeth *Coals*, where it entreth; So it doth allay *Heat*, where it toucheth: And therefore note well, that *Moisture*, although it doth not pass thorow *Bodies*, without *Communication* of some *Substance*, As *Heat* and *Cold* doe;) yet it worketh manifest Effects; not by *Entrance* of the *Body*, but by *Qualifying* of the *Heat*, and *Cold*: As we see in this *Instance*: And we see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*) differeth not much from the *Water* of *Things distilled* by *Fire*: We see also, that *Pewter-Dishes*, with *Water* in them, will not *Melt* easily; But without it, they will; Nay, we see more, that *Butter*, or *Oil*, which in themselves are *Inflam-
mable*, yet by the *Vertue* of their *Moisture*, will do the like.

Experiment
Solitary touch-
ing *Yawn-
ing*.

685

It hath been noted by the *Ancients*, that it is dangerous to *Pick* ones *Ear*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the *Inner Parch-
ment* of the *Ear* is extended, by the *Drawing* in of the *Spirit* and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly *Drawn* in, and then strongly *Expelled*.

Experiment
Solitary touch-
ing the *Hic-
cough*.

686

It hath been observed by the *Ancients*, that *Sneezing* doth cease the *Hic-
cough*. The *Cause* is, for that the *Motion* of the *Hiccough* is a *lifting up* of the *Stomach*; which *Sneezing* doth somewhat depress, and divert the *Motion* another way. For first we see, that the *Hiccough* cometh of *Fulness* of *Meat*, (especially in *Children*;) which causeth an *Extension* of the *Stomach*: Wee see also, it is caused by *Acide Meats*, or *Drinks*, which is by the *Pricking* of the *Stomach*: And this *Motion* is ceased either by *Diversion*. Or by *Detention* of the *Spirits*: *Diversion*, as in *Sneezing*; *Detention*, as we see *Holding* of the *Breath*, doth help somewhat to cease the *Hiccough*: And putting a man into an *Earnest Study* doth the like.: As is commonly used: And *Vinegar* put to the *Nostrils*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibireth the *Motion* of the *Spirit*.

Experiment
Solitary touch-
ing *Snee-
zing*.

687

Looking against the *Sun*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nostrils*; For then the holding up of the *Nostrils* against
the

the *Sunne*, though one *Winke*, would do it; But the *Drawing* downe of the *Moisture* of the *Brain*: For it will make the *Eyes* run with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Noftrils*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Noftrils* within, doth draw the *Moisture* to the *Noftrils*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath been observed, that if one be about to *Sneeze*, the *Rubbing* of the *Eyes*, till they run with *Water*, will prevent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Noftrils*, is diverted to the *Eyes*.

The *Teeth* are more, by *Cold Drink*, or the like, affected, than the other *Parts*. The *Cause* is double, The *One*, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Flesh*; for that the *Flesh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The *Other* is, for that the *Teeth*, are *Parts* without *Blood*; Whereas *Blood* helpeth to qualifie the *Cold*: And therefore we see, that the *Sinews* are much affected with *Cold*; For that they are *Parts* without *Blood*: So the *Bones* in *Sharp Colds* wax *Brittle*: And therefore it hath been seen, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to *Cure*.

Experiment Solitary touching the Tenderness of the Teeth.

688

IT hath been noted, that the *Tongue* receiveth, more easily, *Tokens* of *Dis-eases*, than the other *Parts*; As of *Heats* within, which appear most in the *Blacknesse* of the *Tongue*. Again, *Pied Cattel* are spotted in their *Tongues*, &c. The *Cause* is, (no doubt,) the *Tenderneß* of the *Part*, which thereby receiveth more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment Solitary touching the Tongue.

689

When the *Mouth* is out of *Taste*, it maketh Things taste, some-times *Salt*; Chiefly *Bitter*; And sometimes *Loathsome*; But never *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathsome*; But *Sweet* never; For the rest are *Degrees* of *Corruption*.

Experiment Solitary touching the Taste.

690

IT was observed in the *Great Plague* of the last Year, that there were seen, in divers *Ditches*, and low grounds about *London*, many *Toads*, that had *Tails*, two or three Inches long, at the least; Whereas *Toads* (usually) have no *Tails* at all. Which argueth a great *Disposition* to *Putrefaction* in the *Soil* and *Air*. It is reported likewise, that *Roots* (such as *Carrets*, and *Parfnips*,) are more *Sweet*; and *Lushion*, in *Infectious Years*, than in other Years.

Experiment Solitary touching some Prognosticks of Pestilential Seasons.

691

Wise *Physicians* should with all diligence inquire, what *Simples* Nature yeildeth, that have extream *Subtile Parts*, without any *Mordication*, or *Acrimony*: For they undermine that which is *Hard*; They open that which is *Stopped*, and *Shut*; And they expell that which is *Offensive*, gently, without too much *Perturbation*. Of this Kind are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this Kinde is the *Dwarf-Pine*; which is Proper for the *Jaundies*: Of this Kinde is *Harts-Horn*; which is Proper for *Agues*, and *Infections*: Of this Kinde is *Piony*, which is Proper for *Stoppings* in the *Head*: Of this Kind is *Fumitory*; which is Proper for the *Spleen*: And a Number of others. Generally, divers *Creatures* bred of *Putrefaction*, though they be some-what loathsome to take, are of this kinde, As *Earth-wormes*, *Timber-Sowes*, *Snails*, &c. And I conceive, that the *Trochicks* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes

Experiment Solitary, touching Special Simples for Medicines.

692

condited, and corrected, (which of late are grown into some Credit,) are of the same Nature. So the *Parts of Beasts Putrefied*; (as *Castoreum*, and *Musk*, which have extream *Subtili Parts*, are to be placed amongst them. We see also that *Putrefaction of Plants* (as *Agarick*, and *Jews-Eare*,) are of greatest Vertue. The Cause is, for that *Putrefaction* is the Subtilest of all *Motions*, in the *Parts of Bodies*: And since we cannot take down the *Lives of Living Creatures*, (which some of the *Paracelsians* say (if they could be taken down,) would make us *Immortal*;) the Next is for *Subtily of Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

Experiments
in Confort,
touching *Ve-*
nus.

693

IT hath been observed by the *Ancients*, that *Much Use of Venus* doth *Dimme* the *Sight*; And yet *Eunuches*, which are unable to generate, are (nevertheless) also *Dimme-Sighted*. The Cause of *Dimness of Sight*, in the Former, is the *Expence of Spirits*: In the Latter, the *Over-moisture* of the *Braine*, For the *Over-moisture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their *Passages*; As we see by the *Decay*, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurrereth as another Cause: we see also that *Blindness* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuches*, there are all the *Notes of Moisture*; As the *Swelling* of their *Thighes*, the *Looseness* of their *Belly*, the *Smoothness* of their *Skin*, &c.

694

The *Pleasure* in the *Act of Venus*, is the greatest of the *Pleasures* of the *Senses*; The *Matching* of it with *Itch* is un-proper; though that also be *Pleasing* to the touch. But the *Causes* are *Profound*. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many *Severall Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of *several* frame; And so are the *Parts* for *Generation*. Therefore *Scaliger* doth well, to make the *Pleasure of Generation* a *sixth Sense*; And if there were any other differing *Organs* & *Qualified Perforations*, for the *Spirits* to pass, there would be more than the *Five Senses*: Neither do we well know, whether some *Beasts* and *Birds*, have not *Senses* that we know not; And the very *Sent* of *Dogs* is almost a *Sense* by it self. Secondly, the *Pleasures* of the *Touch*, are greater and deeper, than those of the other *Senses*; As we see in *Warming* upon *Cold*; Or *Refrigeration* upon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits* *immediately*, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, we see their great and sudden *Effect* in fetching *Men* again, when they swoone: For *Drinke*, it is certain, that the *Pleasure of Drunkenness*, is next the *Pleasure of Venus*: And *Great Joies* (likewise) make the *Spirits* move, and touch themselves: And the *Pleasure of Venus* is somewhat of the same *Kinde*.

695

It hath been always observed, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The Cause is, for that the *Spirits*, in a *Body* more *Hot* and *Dry*, (as the *Spirits* of *Men* are,) by the *Summer* are more *exhaled*, and *dissipated*; And in the *Winter* more *condensed*, and kept *entire*: But in *Bodies* that are *Cold* and *Moist*, (as *Womens* are,) the *Summer* doth *Cherish* the *Spirits*; & calleth them forth; the *Winter* doth *dull* them. Furthermore, the *Abstinence*, or *Intermission* of the use of *Venus*, in *Moist* and *well habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is evident; For that it is a *Principal Evacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Evacuation*, but

but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

The *Nature* of *Vivification* is very worthy the Enquiry: And as the *Nature* of *Things* is commonly better perceived, in *Small*, than in *Great*; and in *unperfect*, than in *Perfect*; and in *Parts*, than in *whole*: So the *Nature* of *Vivification* is best inquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Disclosing* the *Original* of *Vivification*. Secondly, in *Disclosing* the *Original* of *Figuration*. Thirdly, in *Disclosing* many things in the *Nature* of *Perfect* *Creatures*, which in them lie more hidden. And Fourthly, in *Traducing* by way of *Operation*, some *Observations* in the *Insecta*, to work *Effects* upon *Perfect* *Creatures*. Note, that the word *Insecta* agreeth not with the *Matter*, but we ever use it for *Brevities* sake, intending by it *Creatures* bred of *Putrefaction*.

Experiments in
Confort, rouching the
Insecta.

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The *Insecta* are found to breed out of several *Matters*: Some breed of *Mud* or *Dung*, As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth *Putrifie*, as not able to *Preserve* it self: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions* of *Nourishment*. Some breed in *Wood*, both *Growing*, and *Cut* down. *Quere* in what *Woods* molt, and at what *Seasons*? We see that the *Wormes* with many *Feet*, which round themselves into *Balls* are bred chiefly under *Logs* of *Timber*, but not in the *Timber*; And they are said to be found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their *Generation* requireth a *Coverture* both from *Sun*, and *Rain* or *Dew*, As the *Timber* is; And therefore they are not *Venemous*, but (contrariwise) are held by the *Physicians* to *clarifie* the *Bloud*. It is observed that *Cinices* are found in the holes of *Bed-Sides*. Some breed in the *Hair* of *Living* *Creatures*; As *Lice*, and *Tikes*, which are bred by the *Sweat* close kept, and somewhat *aired* by the *Hair*. The *Excrements* of *Living* *Creatures* doe not onely breed *Insecta*, when they are *Excerned*, but also while they in the *Body*; As in *Wormes* whereto *Children* are most subject, and are chiefly in the *Guts*. And it hath been lately observed by *Physicians*, that in many *Pestilent* *Diseases* there are *Wormes* found in the upper *Parts* of the *Body*, where *Excrements* are not, but only *Humours* *Putrified*, *Fleas* breed principally of *Straw* or *Mats*, where there hath been a little *Moisture*; Or the *Chamber* and *Bed-straw*, kept close, and not *Aired*. It is received that they are killed by *strewing* *Worm-wood* in the *Rooms*. And it is truly observed, that *Bitter* *Things* are apt, rather to kill, then engender *Putrefaction*; And they be *Things* that are *Fat* or *Sweet*, that are aptest to *Putrifie*. There is a *Worm*, that breedeth in *Meal*, of the shape of a large white *Maggot*, which is given as a great dainty to *Nightingales*. The *Moath* breedeth upon *Cloth*; and other *Lanifices*: Especially if they be laid up dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worm* called a *Wet-lil*, bred under *Ground*, and that feedeth upon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *Waters* especially shaded, but they must be by *Standing* *Waters*; As the *Water-Spider* that hath six *Legs*. The *Flie* called the *Gad-flie*, breedeth of somewhat that *Swimmeth* upon the *Top* of the *Water*, and is most about *Ponds*. There is a *Worm* that breedeth of the *Dregs*
of

of *Wine Decayed*, which afterwards, (as is observed by some of the *Ancients*) turneth into a *Gnat*. It hath been observed by the *Ancients*, that there is a *Worm* that breedeth in old *Snow*, and is of Colour *Reddish*, and dull of Motion, and dieth soon after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly *Vivifie*. And the Reason of the *Dying* of the *Worm*, may be the sudden *Exhaling* of that little *Spirit*, as soon as it commeth out of the *Cold*, which had shut it in. For as *Butter-flies* quicken with *Heat*, which were benumbed with *Cold*; So *Spirits* may exhale with *Heat*, which were preserved in *Cold*. It is affirmed both by the *Ancient* and *Modern Observation*, that in *Furnaces* of *Copper* and *Brass*, where *Chalcites* is (which is *Vitriol*), often cast in, to mend the working, there riseth suddenly a *Flie*, which sometimes moveth, as if it took hold on the walls of the *Furnace*; Sometimes is seen moving in the *Fire* below; And dieth presently, as soon as it is out of the *Furnace*. Which is a Noble Instance, and worthy to be weighed; for it sheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Living Creatures*, will *Vivifie*, if it have Matter Proportionable. Now the great *Axiome* of *Vivification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Æthere Spirit* to be dilated; *Matter*, *Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be put forth, and *Figurrd*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soon as ever it coolerth never so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we see in *Chymical Trials*. Briefly, most *Things Putrified* bring forth *Insecta* of several Names, But we will not take upon us now to Enumerate them all.

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The *Insecta* have been noted by the *Ancients* to feed little: But this hath not been diligently observed; For *Grasshoppers* eat up the *Green* of whole *Countrys*; And *Silk-Womes* devour *Leaves* swiftly; And *Ants* make great *Provision*. It is true, that *Creatures*, that sleep and rest much, Eat little, As *Dormice* and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Juyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integral Parts* have Extream Variety, but the *Similar Parts* little. It is true, that they have, (some of them,) *Diaphragme*, and an *Intestine*; And they have all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long life*: Yet *Bees* have been known to live seven years: And *Snakes* are thought the rather for the *Casting* of their *Spoil*, to live till they be Old: And *Eeles*, whose many times breed of *Putrefaction*, will live and grow very long: And those that Enterchange from *Wormes* to *Flies* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, have been kept in *Boxes* four yeers at the least. Yet there are certain *Flies* that are called *Ephemera*, that live but a day. The *Cause* is, the *Exilitie* of the *Spirit*; Or perhaps the *Absence* of the *Sun*; For that if they were brought in, or kept close, they might live longer. Many of the *Insecta*, (as *Butter-flies*, and other *Flies*), revive easily, when they seem dead, being brought to the *Sun* or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vital Spirit*, and the easie dilating of it by a little *Heat*. They stir a good while after their *Heads* are off, or that they be cut in *Pieces*; which is caused also, for that their *Vital Spirits* are more diffused thorow out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

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The *Insecta* have *Voluntary Motion*, and therefore *Imagination*; And where as some of the *Ancients* have said, that their *Motion* is indeterminate, and their *Imagination* Indefinite, it is negligently observed; for *Ants* goe right forwards,

forwards to their Hills; And *Bees* do (admirably) know the way from a Flowry Heath, two or three Miles off, to their Hives. It may be, *Gnats*, and *Flies*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have only the *Sense* of *Feeling*; which is manifestly untrue; For if they go forth right to a Place, they must needs have *Sight*: Besides, they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste*: And *Bees* are called with *Sound* upon *Brass*, and therefore they have *Hearing*: Which sheweth likewise that though their *Spirits* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations concerning the *Insecta*; together with the Enumeration of them, we referre to that place, where we mean to handle the Title of *Animal's* in general.

A *Man* Leapeth better with *Weights*, in his *Hands*, than without. The Cause is, for that the *Weight*, (if it be proportionable,) strengtheneth the *Sinewes*, by Contracting them. For otherwise, where no *Contraction* is needful, *Weight* hindreth. As we see in *Hors-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Arms* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* go backward before they take their Rise. *Quere*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were to break forth with more Force: As *Breath* also drawn, and kept in, cometh forth more forcibly: And in *Casting* of any *Thing*, the *Arms*, to make a greater *Swing*, are first cast backward.

OF *Musicall Tones*, and *Unequal Sounds*, we have spoken before; But touching the *Pleasure* and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpned; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching Noise*; make a *Shivering* or *Horror* in the *Body*, and set the *Teeth* on edge. The Cause is, for that the *Objects* of the *Eare*, do affect the *Spirits* (immediatly) most with *Pleasure* and *Offence*. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There be *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odious*, or *Fearful*; But the same *Things Painted* do little affect. As for *Smels*, *Tastes*, and *Touches*, they be *Things* that do affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediatly, and incorporeally affect most: This is most manifest in *Musick*; and *Concords* and *Discords* in *Musique*: For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a Roundness and *Equality*; And if they be Harsh, are *Unequal*: For a *Discord* it self is but a *Harshness* of *Divers Sounds Meeting*. It is true, that *Inequality*, not Stayed upon, but *Passing*, is rather an *Encrease* of *Sweetness*; As in the *Purling* of a *Wreathed String*; And in the *Raucity* of a *Trumpet*; And in the *Nightingale-Pipe* of a *Regall*; And in a *Discord* straight falling upon a *Concord*: But if you stay upon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*, and *Displeasing* in *Scunds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by *divers Names*, as *Skriching*, or *Grating*, such as we now speak of. As for the *Setting* of the *Teeth* on *Edge*, we plainly see what an *Intercourse* there is, between the *Teeth*, and the *Organ* of the *Hearing*, by the *Taking* of the *End* of a *bow*, between the *Teeth*, and *Striking* upon the *Strig*.

Experiment
Solitary touching
Leaping.
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Experiment
Solitary touching the
Pleasures, and
Displeasures of
the Senses, especially of
Hearing.
700

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NATURALL HISTORY:

Century VIII.



Here be *Minerals*, and *Fossiles*, in great Variety; but of *Veins of Earth Medicinal*, but few; The Chief are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Arminus*: Whereof *Terra Lemnia* is the Chief. The *Vertues* of them are, for *Curing of Wounds*, *Stanching of Bloud*, *Stopping of Fluxes and Rheumes*, and *Arresting the Spreading of Poison, Infection, and Putrefaction*: And they have of all other *Simples*, the *Perfectest and Purest Quality of Drying*, with little or no *Mixture of any other Quality*. Yet it is true, that the *Bole Arminick* is the most *Cold* of them; And that *Terra-Lemnia* is the most *Hot*; For which cause the *Island Lemnia*, where it is digged, was in the *Old Fabulous Ages* consecrated to *Vulcan*.

A *Bout* the *Bottome* of the *Straights* are gathered great *Quantities* of *Sponges*, which are gathered from the *fides* of *Rocks*, being, as it were, a large, but tough, *Moss*. It is the more to be noted, because that there be but few *Substances, Plant-like*, that grow deep within the *Sea*; For they are gathered sometime fifteen *Fathom* deep; And when they are laid on *Shoare*, they seem to be of great *Bulk*; But crushed together, will be transported in a very small *Room*.

I *T* seemeth that *Fish*, that are used to the *Salt-Water*, do nevertheless delight more in *Fresh*. We see, that *Salmons*, and *Smelts* love to get into *Rivers*, though it be against the *Stream*. At the *Haven* of *Constantinople*, you shall have great *Quantities* of *Fish* that come from the *Euxine-Sea*; that when they come into the *Fresh-Water*, do inebriate and turn up their *Bellies*; So as you may take them with your *Hand*. I doubt, there hath not been sufficient *Ex-*

Experiment
Solitary touching
Veins of
Medicinal
Earth.

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Experiment
Solitary touching
the
Growth of
Sponges.

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Experiment
Solitary touching
Sea Fish
put in Fresh
waters.

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periment made of Putting *Sea-fish* into *Fresh Water*, *Ponds*, and *Pools*. It is a Thing of great Use, and Pleasure: For so you may have them new at some good distance from the *Sea*: And besides, it may be, the *Fish* will eat the pleasanter, and may fall to breed: And it is said, that *Colchester Oysters*, which are put into *Pits*, where the *Sea* goeth and cometh; (but yet so, that there is a *Fresh Water* comming also to them, when the *Sea* voideth,) become by that means Fatter, and more Grown.

Experiment
Solitary touch-
ing Attraction by Simi-
litude of Sub-
stance.

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THe *Turkish-Bow* giveth a very Forcible *Shoot*; Inſomuch as it hath been known, that the *Arrow* hath pierced a *Steel Target*, or a Piece of *Brass* of two Inches thick: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath been known to pierce thorow a piece of *Wood*, of eight Inches thick. And it is certain, that we had in use at one time, for *Sea-fight*, short *Arrows*, which they called *Sprights*, without any other Heads, save *Wood* sharpened; which were discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce. But this dependeth upon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude of Substance* will cause *Attraction*, where the Body is wholly freed from the *Motion of Gravity*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the help of the *Load-stone*. But this same *Motion of Weight* or *Gravity*, (which is a meer *Motion of Matter*, and hath no *Affinity* with the *Form*, or *Kind*,) doth kill the other *Motion*, except it self be killed by a violent *Motion*; And in these *Instances of Arrows*; For then the *Motion of Attraction* by *Similitude of Substance*, beginneth to shew it self. But we shall handle this Point of *Nature* fully in due Place.

Experiment
Solitary touch-
ing certain
Drinks in Tur-
key.

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THEY have in *Turkey*, and the *East*, certain *Confections*, which they call *Servets*, which are like to *Candid Conſerves*, And are made of *Sugar* and *Lemons*, or *Sugar* and *Citrons* or *Sugar* and *Violets*, and some other *Flowers*; And some Mixture of *Amber* for the more delicate Persons; And those they dissolve in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I do much marvel, that no *Englishman*, or *Dutchman*, or *German*, doth set up *Brewing* in *Constantinople*; Considering they have such Quantity of *Barley*. For as the general Sort of *Men*, *Frugality* may be the Cause of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drink*: But the better Sort might well be at the Cost. And yet I wonder the less at it, because I see *France*, *Italy*, or *Spain*, have not taken into use, *Beer*, or *Ale*, Which (perhaps) if they did, would better both their *Healths* and their *Complexions*. It is likely it would be Matter of great Gain to any, that should begin it in *Turkey*.

Experiments
in Conſort,
touching
Sweat,

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IN *Bathing* in *Hot Water*, *Sweat* (nevertheless) commeth not in the *Parts* under the *Water*. The Cause is; First, for that *Sweat* is a *Kind* of *Colligation*. And that *Kind* of *Colligation* is not made, either by an *Over-Dry Heat*, or an *Over-Moist Heat*. For *Over-Moisture* doth somewhat extinguish the *Heat*; As we see that even *Hot Water* quengeth *Fire*: And *Over-Dry Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* covered before the *Sun*, or *Fire*, than if they stood naked; And *Earthen Bottles*, filled with *Hot Water*, do provoke, in Bed, a *Sweat* more daintily, than *Brick-Bats* *Hot*. Secondly, *Hot Water* doth cause *Evaporation* from the *Skin*; So as it spendeth the Matter, in those *Parts* under the *Water*, before it issueth in

Sweat,

Sweat. Again, *Sweat* commeth more plentifully, if the *Heat* be increased by *Degrees*, than if it be greatest at first, or equal. The *Cause* is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physicians* may do well, when they provoke *Sweat* in Bed, by *Bottles*, with a *Decuction* of *Sudorifick Herbs*, in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *less Heated* first, and after half an Hour the more *Heated*.

Sweat is *Salt* in Taste, the *Cause* is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud* and *Flesh*; And the *Sweat* is onely that *Part*, which is *Separate*, and *Excerned*. *Bloud* also *Raw*, hath some *Saltiness*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtil *Excretion* from the *Bloud*.

Sweat commeth forth more out of the *Upper Parts* of the *Body*, than the *Lower*; The *Reason* is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are less *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are less *Fleshy*, and more *Dry*; As the *Fore-head*, and *Breast*.

Men *Sweat* more in *Sleep*, than *Waking*; And yet *Sleep* doth rather stay other *Fluxions*; than cause them; As *Rheumes*, *Loosness* of the *Body*, &c. The *Cause* is, for that in *Sleep*, the *Heat*, and *Spirits* do naturally move inwards, and there rest. But when they are collected once within, the *Heat* becometh more *Violent*, and *Irritate*; And thereby expelleth *Sweat*.

Cold Sweats are (many times) *Mortal*, and near *Death*; And always *Ill*, and *Suspected*; As in *Great Fears* *Hypochondriacal Passions*, &c. The *Cause* is, for that *Cold Sweats* come by a *Relaxation*, or *Forsaking* of the *Spirits*, whereby the *Moisture* of the *Body*, which *Heat* did keep firm in the *Parts* severeth, and issueth out.

In those *Diseases*, which cannot be discharged by *Sweat*, *Sweat* is *ill*, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases* which are expelled by *Sweat*, it easeth and lighneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the *Latter Sort* is partly *Critical*, and sendeth forth the *Matter* that offendeth; But in the *Former*, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them *Oppressed*; Or from *Motion* of *Consent*, when *Nature* not able to expel the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*.

The *Nature* of the *Glo-worm* is hitherto not well observed. Thus much we see; That they breed chiefly in the *Hottest Months* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heats*: And again, that by reason of the *Fineness*, it doth easily exhale. In *Italy*, and the *Hotter Countreys*, there is a *Fly* they call *Luciole*, that shineth as the *Glo-worm* doth; And it may be is the *Flying-Glo-worm*. But that *Flie* is chiefly upon *Fens*, and *Marishes*. But yet the two former *Observations* hold; For they are not seen, but in the *Heat* of *Summer*; And *Sedge*, or other *Green* of the *Fens*, give as good *Shade*, as *Bushes*. It may be the *Glo-worms* of the *Cold Countreys* ripen not so far as to be *Winged*.

The *Passions* of the *Minde*, work upon the *Body* the *Impressions* following. *Fear* causeth *Paleness*; *Trembling*; The *Standing* of the *Haire* upright;

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Experiment Solitary touching the *Glo-worme*.

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Experiments in Consort, touching the *Impressions*, which the *Passions* of the *Minde* make upon the *Body*.

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right; *Starting*; and *Scratching*. The *Paleness* is caused, for that the *Bloud* runneth inward to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing upright* of the *Haire* is caused, for that by *Shutting* of the *Pores* of the *Skin*, the *Haire* that lieth asloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that kind, it is a *Motion* of *Shrinkings*;) And likewise an *Inquisition*, in the beginning, what the *Matter* should be; (And in that kind it is a *Motion* of *Erection*;) And therefore, when a *Man* would listen suddenly to any *Thing*, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend *Scratching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they be unprofitable to expel that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* upon *Pain*,

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Grief, and *Pain* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*, *Distorting* of the *Face*, *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the *Drawing* in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty. *Sobbing* is the same *Thing* stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath been said: For when the *Spirits* cannot expel the *Thing* that hurteth, in their *Strife* to do it, by *Motion* of *Consent*, they expel the *Voice*. And this is, when the *Spirits* yield, and give over to resist; For if one do constantly resist *Pain*, he will not groan. *Teares* are caused by a *Contraction* of the *Spirits* of the *Brain*; Which *Contraction* by consequence astringeth the *Moisture* of the *Brain*, and thereby sendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*: For *Wringing* is a *Gesture* of *Expression* of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first, to bear and resist, and then to expel; Which maketh the *Parts* knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Sweating* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expel.

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Joy causeth a *Cheerfulness* and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Teares*. All these are the effects of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Lively*, and *Stirring*. We know it hath been seen, that *Excessive sudden Joy* hath caused *Present Death*, while the *Spirits* did spread to much, as they could not retire again. As for *Tears*, they are the Effects of *Compression* of the *Moisture* of the *Brain*, upon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Brain*, by *Consent*, as hath been said in *Grief*. But then in *Joy*, it worketh it diversly, viz. by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupy more *Room*.

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Anger causeth *Paleness*, in some, and the *Going* and *Comming* of the *Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Paleness*, and *Going*, and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselves, call in more *Spirits* from the *Outward Parts*. And if the *Paleness* be alone, without *Sending* forth the *Colour* again, it is commonly joynd with some *Fear*; but in many there is no *Paleness* at all, but contrariwise *Redness* about the *Cheeks*, and *Gills*; Which is by the *Sending* forth of the

Spi-

Spirits in an *Appetite to Revenge*. *Trembling in Anger* is likewise by a *Calling* in of the *Spirits*; And is commonly when *Anger* is joyned with *Fear*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boiling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same *Cause*, being an *Ebullition*; *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Revenge*.

Light Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horror* doe; Namely, from the *Retiring* of the *Spirits*, but in a less degree. For the *Shaking* of the *Head* is but a *Slow* and *Definite Trembling*; And is a *Gesture* of *Slight Refusal*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand* which we use, when we refuse a *Thing*, or warn it away. The *Frowning* and *Knitting* of the *Browes*, is a *Gathering*, or *Serving* of the *Spirits*, to resist in some Measure. And we see also, this *Knitting* of the *Browes* will follow upon earnest *Studying*, or *Cogitation* of any *Thing*, though it be without *Dislike*.

Shame causeth *Blushing*; And *Casting Down* of the *Eyes*. *Blushing* is the *Resort* of *Bloud* to the *Face*; Which in the *Passion* of *Shame*, is the *Part* that laboureth most. And although the *Blushing* will be seen in the whole *Breast*, if it be *Naked*, yet that is but in *Passage* to the *Face*. As for the *Casting down* of the *Eyes*, it proceedeth of the *Reverence* a *Man* beareth to other *Men*; Whereby, when he is ashamed, he cannot endure to look firmly upon *Others*: And we see, that *Blushing*, and the *Casting down* of the *Eyes* both, are more when we come before *Many*; *Ore Pompeii quid mollius? Nunquam non coram pluribus erubuit*: And likewise when we come before *Great*, or *Reverend Persons*.

Pity causeth sometimes *Tears*; And a *Flexion* or *Cast* of the *Eye aside*. *Tears* come from the same *Cause* that they do in *Grief*: for *Pity* is but *Grief* in *Anothers* Behalf. The *Cast* of the *Eye* is a *Gesture* of *Aversion*, or *Lothness* to behold the *Object* of *Pity*.

Wonder causeth *Astonishment*, or an *Immoveable Posture* of the *Body*; *Casting up* of the *Eyes* to *Heaven*; And *Lifting up* of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* upon one *Object* of *Cogitation*, whereby it doth not spariate and transcurre, as it useth: For in *Wonder* the *Spirits* flie not, as in *Feare*; But onely settle, and are made less apt to move. As for the *Casting up* of the *Eyes*, and *Lifting up* of the *Hands*, it is a *Kind* of *Appeal* to the *Deity*; Which is the *Authour*, by *Power*, and *Providence*, of *Strange Wonders*.

Laughing causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interjection* of *Laughing*; *Shaking* of the *Breast*, and *Sides*; *Running* of the *Eyes* with *Water*, if it be *Violent*, and *Continued*. Wherein first it is to be understood, that *Laughing* is scarce (properly) a *Passion*, but hath his *Source* from the *Intellect*; For in *Laughing* there ever precedeth a *Conceit* of somewhat *Ridiculous*. And therefore it is *Proper* to *Man*. Secondly, that the *Cause* of *Laughing* is but a *Light Touch* of the *Spirits*, and not so deep an *Impression* as in other *Passions*. And therefore (that which hath no *Affinity* with the *Passions* of the *Minde*,) it is moved, and that in great vehemency, onely by *Tickling* some *Parts* of the *Body*: And we see that *Men* even in a *Grieved State* of *Minde*, yet cannot sometimes forbear *Laughing*. Thirdly, it is ever joyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinity* with *Joy*, though it be much *Lighter Motion*: *Res severa est verum Gaudium*,

dium. Fourthly, that the *Object* of it is *Deformity*, *Absurdity*, *Shrewd Turns*, and the like. Now to speak of the *Causes* of the *Effects* before-mentioned, whereunto these *General Notes* give some *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voice*, and *Shaking* of the *Breast* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Especially being *Sudden*. So likewise, the *Running* of the *Eyes* with *Water*, (as hath been formerly touched, where we spake of the *Tears*, of *Joy* and *Grief*;) is an *Effect* of *Dilatation* of the *Spirits*. And for *Suddenness*, it is a great *Part* of the *Matter*: For we see, that any *Shrewd Turn* that lighteth upon Another; Or any *Deformity*, &c. moveth *Laughter* in the *Instant*; Which after a little time it doth not. So we cannot *Laugh* at any thing after it is *Stale*, but whilest it is *New*: And even in *Tickling*, if you *Tickle* the *Sides*, and give warning; Or give a *Hard*, or *Continued Touch*, it doth not move *Laughter* so much.

722

Lust causeth a *Flagrancy* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight* and the *Touch*, are the *Things* desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in general, (for that great *Use* may be made of the *Observation*;) that (evermore) the *Spirits* in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the *Eyes*, and *Venerous Parts*: In *Fear*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*.

Experiments
in Consort,
touching
Drunkenness.

723

724

IT hath been observed by the *Ancients*, and is yet believed, that the *Sperm* of *Drunken Men* is *Unfruitful*. The *Cause* is, for that it is *Over-moistened*, and wanteth *Spissitude*. And we have a merry Saying, That they that go *Drunk to Bed*, get *Daughters*.

Drunken Men are taken with a plain *Defect*, or *Destitution* in *Voluntary Motion*. They *Reel*; They *tremble*; They cannot stand, nor speak strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresses the *Spirits Animal*, and occupate *Part* of the *Place*, where they are; And so make them *Weak* to move. And therefore *Drunken Men* are apt to fall asleep: And *Opiates*, and *Stupefactive*, (as *Poppy*, *Henbane*, *Hemlock*, &c.) induce a kinde of *Drunkenness*, by the *Grossness* of their *Vapour*, as *Wine* doth by the *Quantity* of the *Vapour*. Besides, they rob the *Spirits Animal* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey upon it, as well as they: And so they make the *Spirits* less *Supple*, and *Apt* to move.

725

Drunken Men imagine every *Thing* turneth round; They imagine also that *Things* come upon them; They See not well *Things* as farre off; Those *Things* that they See near hand, they See out of their place; And (sometimes) they see *Things* double. The *Cause* of the *Imagination* that *Things* turn Round, is, for that the *Spirits* themselves turn, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* upon *Compression*, turneth, as we see in *Water*;) And it is all one to the *Sight*, whether the *Visual Spirits* move, or the *Object* moveth, or the *Medium* moveth. And we see that long *Turning Round* breedeth the same *Imagination*. The *Cause* of the *Imagination* that *Things* come upon them, is, for that the *Spirits Visual* themselves draw back; which maketh the *Object* seem to come on, And besides, when they see *Things* turn Round, and Move, *Fear* maketh them think they come upon them. The *Cause* that they cannot see *Things* as farre off, is the *Weakness* of the *Spirits*; for in every *Megrim*, or *Vertigo*, there is an *Oblenebration* joynd with a *Semblance* of *Turning Round*; Which we see also in the lighter Sort of *Swozings*.

ninos. The Cause of Seeing things out of their Place, is the Refraction of the Spirits Visual; For the Vapour is as an Unequal Medium; And it is, as the Sight of Things, out of place, in Water. The Cause of Seeing Things double; is, the Swift and Quiet Motion of the Spirits (being Oppressed,) to and fro; For; (as was said before,) the Motion of the Spirits Visual, and the Motion of the Object, make the same Appearances; And for the Swift Motion of the Object, we see, that if you fillip a Lute-string, it sheweth double, or Treble.

Men are sooner Drunk with Small Draughts, than with Great. And again, Wine Sugred in-ebriateth less, than Wine Pure. The Cause of the Former is, for that the Wine descendeth not so fast to the Bottom of the Stomach; But maketh longer Stay in the Upper Part of the Stomach, and sendeth Vapours faster to the Head; And therefore in-ebriateth sooner. And, for the same Reason, Sops in Wine, (Quantity for Quantity,) in-ebriate more, than Wine of it self. The Cause of the Latter is, for that the Sugar doth inspissate the Spirits of the Wine, and maketh them not so easie to resolve into Vapour. Nay further, it is thought, to be some Remedy against In-ebriating, if Wine Sugred be taken after Wine Pure. And the same Effect is wrought either by Oile, or Milk, taken upon much Drinking.

726

The Use of Wine, in Dry, and Consumed Bodies, is hurtful; In Moist, and Full Bodies, it is good. The Cause is, for that the Spirits of the Wine do prey upon the Dew, or Radical Moisture, (as they term it,) of the Body, and so deceive the Animal Spirits. But where there is Moisture Enough, or Superfluous, there Wine helpeth to digest, and defecate the Moisture.

Experiment Solitary touching the Help or Hurt of Wine, though Moderately used.

The Caterpillar is one of the most General of Wormes, and breedeth of Dew, and Leaves; For we see infinite Number of Caterpillers, which breed upon Trees and Hedges; By which the Leaves of the Trees, or Hedges are in great Part consumed; As well by their Breeding out of the Leaf, as by their Feeding upon the Leaf. They breed in the Spring chiefly, because then there is both Dew, and Leaf. And they breed commonly when the East Winds have much blown: The Cause whereof is, the Driness of that Wind: For to all Vivification upon Putrefaction, it is requisite the Matter be not too Moist: And therefore we see, they have Copwebs about them, which is a signe of a Slimy Driness: As we see upon the Ground, whereupon, by Dew, and Sun Copwebs breed all over. We see also the Green Caterpillar breedeth in the Inward Parts of Roses, especially not blown, where the Dew sticketh: But especially Caterpillers, both the greatest, and the most, breed upon Cabbages; which have a Fat Leaf, and apt to Putrifie. The Caterpillar toward the End of Summer waxeth Volatile, and turneth to a Butterflie, or perhaps, some other Fly. There is a Caterpillar, that hath a Furre, or Down upon him and seemeth to have Affinity with the Silk-worm.

727 Experiment Solitary touching Caterpillers.

728

The Flies Cantharides are bred of a Worme, or Caterpillar, but peculiar to certain Fruit-Trees, As are the Fig-Tree, the Pine-Tree, and the Wilde Briar; All which bear Sweet Fruit; And Fruit that hath a kind of secret Biting, or Sharpness: For the Fig hath a Milke in it, that is Sweet, and Corrosive; The Pine-Apple hath a Kernel that is Strong and Abstersive: The Fruit of the Briar is said to make Children, or those that Eat them, Scabbed. And therefore, no marvel though Cantharides have such a Corrosive, and Cauterizing Quality; For there is not one other of the Insecta, but is bred of a Duller Matter. The Body of the Cantharides is bright-coloured; And it may be;

Experiment Solitary touching the Flies, Cantharides.

729

be, that the delicate-coloured *Dragon-Flies*, may have likewise some *Corrosive Quality*.

Experiments
in Comfort,
touching
Lassitude.

730

Lassitude is remedied by *Bathing*, or *Anointing* with *Oile*, and *Warm Water*. The Cause is, for that all *Lassitude* is a kind of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Anointing* give a *Relaxion*, or *Emollition*: And the *Mixture* of *Oile* and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oile* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth help and discharge *Lassitude*. The Reason whereof is, partly, because by *Chearing* or *Comforting* of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeeth *Weariness*; as *Sleep* likewise doth.

731

In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going down a Hill*, the *Thighes*. The Cause is, for that in the *List* of the *Feet*, when a Man *Goeth up the Hill*, the *Weight* of the *Body* beareth most upon the *Knees*; And in *Going down the Hill*, upon the *Thighes*.

Experiment
Solitary touch-
ing the
Casting of the
Skin, and *Shell*
in some *Crea-
tures*.

732

The *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Casting* of the *Skin* a *New Birth*: And besides, the *Secundine* is but a general *Cover*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are, The *Snake*, the *Viper*, the *Grasshopper*, the *Lizard*, the *Silk-worm*, &c Those that cast their *Shells*, are; The *Lobster*, the *Crab*, the *Cra-fish*, the *Hodmandod*, or *Dodman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* never: So as it is like, they scale off, and crumble away by degrees. And they are known by the *Extream Tenderness* and *Softness* of the *New Shell*; And somewhat by the *Freshness* of the *Colour* of it. The Cause of the *Casting* of *Skin*, and *Shell* should seem to be the great *Quantity* of *Matter* in those *Creatures*, that is fit to make *Skin* or *Shell*; And again, the *Looseness* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certain, that it is the *New Skin*, or *Shell*, that putteth off the *Old*; So we see, that in *Deer*, it is the *Young Horn*, that putteth off the *Old*: And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds* that have much *Matter* for their *Beak*, cast their *Beaks*; The *New Beak* putting off the *Old*.

Experiments
in Comfort,
touching the
Postures of the
Body.

733

Lying, not *Erect*, but *Hollow*, which is in the *Making* of the *Bed*; Or with the *Legs gathered up*, which is in the *Posture* of the *Body*, is the more *Wholesome*. The Reason is, the better *Comforting* of the *Stomach*, which is by that less *Pencil*: And we see, that in *Weak Stomachs*, the *Laying up* of the *Legs high*, and the *Knees almost to the Mouth*, helpeth, and comforteth. We see also that *Gally-slaves*, notwithstanding their *Misery* otherwise, are commonly *Fat* and *Fleshy*; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is *Penfile* in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and *Belly*; As in *Rowing*, and in *Sawing*, being *Set*.

734

Megrims and *Giddiness* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The Cause is, for that the *Vapours*, which were gathered by *Sitting*, by the *Sudden Motion*, flie more up into the *Head*.

735

Leaning long upon any *Part* maketh it *Numme*, and, as we call it, *Asleep*.
The

The Cause is, for that the Compression of the Parts suffereth not the Spirits to have free Access; And therefore when we come out of it, we feel a Stinging; or Pricking; Which is the Re-entrance of the Spirits.

It hath been noted, that those Years are Pestilentiall, and Unwholesome, when there are great Numbers of Frogs, Flies, Locusts, &c. The Cause is plain; For that those Creatures being ingendred of Putrefaction, when they abound, shew a generall Disposition of the Year, and Constitution of the Aire, to Diseases of Putrefaction. And the same Prognostick, (as hath been said before,) holdeth, if you finde Wormes in Oake-Apples. For the Constitution of the Aire, appeareth more subtilly, in any of these Things, than to the Sense of Man.

It is an Observasion amongst Countrey People, that Years of Store of Hayes and Heps do commonly portend Cold Winters; And they ascribe it to Gods Providence, that, (as the Scripture saith) reacheth even to the Falling of a Sparrow; And much more is like to reach to the Preservation of Birds in such Seasons. The Naturall Cause also may be the Want of Heat, and Abundance of Moisture, in the Summer precedent; Which putteth forth those Fruits, and must needs leave great Quantity of Cold Vapours, not dissipate; Which causeth the Cold of the Winter following.

They have in Turkey, a Drink called Coffa, made of a Berry of the same Name, as Black as Soot, and of a Strong Sent, but not Aromatical; Which they take, beaten into Powder, in Water, as Hot as they can Drink it: And they take it, and sit at it in their Coffa-Houses, which are like our Taverns. This Drink comforteth the Brain, and Heart, and helpeth Digestion. Certainly this Berry Coffa; The Root, and Leaf Betell; The Leaf Tobacco; And the Tear of Poppy, (Opium) of which the Turks are great Takers, (supposing it expelleth all Fear,) do all Condense the Spirits, and make them Strong, and Aleger. But it seemeth they are taken after several manners; For Coffa and Opium are taken down; Tobacco but in Smoake; And Betell is but champed in the Mouth, with a little Lime. It is like there are more of them, if they were well found out, and well corrected. Quere of Henbane-Seed; Of Mandrake; Of Saffron, Root, and Flower; Of Folium Indum; Of Amber-grice; Of the Assyrian Amomum, if it may be had; And of the Scarlet Powder, which they call Kermez; And (generally) of all such Things, as do in-ebriate and provoke Sleep. Note that Tobacco is not taken in Root, or Seed, which are more forcible ever than Leaves.

The Turkes have a Black Powder, made of a Mineral called Alcohole; Which with a fine long Pencil they lay under their Eye-Lids; Which doth colour them Black, Whereby the White of the Eye is set off more white. With the same Powder they colour also the Haires of their Eye lids, and of their Eye-browes, which they draw into Embowed Arches. You shall finde that Xenophon maketh mention, that the Medes used to paint their Eyes. The Turkes use with the same Tincture, to colour the Haire of their Heads and Beards Black: And divers with us, that are grown Gray, and yet would appeare Young, finde means to make their Haire black, by Combing it, (as they say,) with a Leaden Combe, or the like. As for the Chineses, who are of an ill Complexion, (being Olivaster,) they paint their Cheeks Scarlet; Especially their King, and Grandees, Generally, Barbarous People, that go Naked,

Experiment Solitary touching Pestilentiall Years. 736

Experiment Solitary touching the Prognosticks of Hard winters. 737

Experiment Solitary touching Medicines that Condense, and Relieve the Spirits. 738

Experiment Solitary touching Painings of the Body. 739

Naked, do not onely paint Themselves, but they pownce and raze their Skin, that the *Painting* may not be taken forth; And make it into Works. So do the *West Indians*; And so did the Ancient *Pelts*, and *Brittons*; So that it seemeth, *Men* would have the *Colours* of *Birds Feathers*, if they could tell how, Or at least, they will have *Gay Skins*, in stead of *Gay Clothes*.

Experiment
Solitary touch-
ing the Use
of Bathing and
Anointing.

740

IT is strange, that the use of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and the *Grecians*, it was as usual, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with us it remaineth but as a Part of *Physick*. I am of Opinion, that the Use of it, as it was with the *Romans*, was hurtful to Health; For that it made the Body Soft, and easie to Waste. For the *Turks* it is more proper, because of their *Drinking Water*, and *Feeding* upon *Rice*, and other Food of small Nourishment, maketh their *Bodies* so Solide, and Hard, as you need not fear that. *Bathing* should make them *Froathy*. Besides, the *Turks* are great *Sitters*, and seldom walk; Whereby they Sweat lesse, and need *Bathing* more. But yet certain it is, that *Bathing*, and especially *Anointing*, may be so used, as it may be a great Help to *Health*, and *Prolongation* of *Life*. But hereof we shall speak in due Place, when we come to handle *Experiments Medicinal*.

Experiment
Solitary touch-
ing Chamole-
tting of Pa-
per.

741

THE *Turks* have a Pretty Art of *Chamoletting* of *Paper*, which is not with us in use. They take divers *Oiled Colours*, and put them severally (in drops) upon *Water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some *Thicknesse*) with it; And the *Paper* will be *Waved*, and *Veined*, like *Chamole*, or *Marble*.

Experiment
Solitary touch-
ing Cuttle-
Inke.

742

IT is somewhat strange, that the *Blond* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and onely the *Blond* of the *Cuttle* should be as *Black* as *Inke*. A Man would think, that the *Cause* should be the *High Concoction* of that *Blond*; For we see in ordinary *Puddings*, that the *Boiling* turneth the *Blond* to be *Black*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment
Solitary touch-
ing Encrease
of weight in
Earth.

743

IT is reported of *Credit*, that if you take *Earth*, from Land adjoining to the *River* of *Nile*; And preserve it in that manner, that it neither come to be *Wet*, nor *Wasted*; And Weigh it daily, it will not alter *Weight* until the seventeenth of *June*, which is the Day when the *River* beginneth to rise; And then it will grow more and more *Ponderous* till the *River* commeth to his Heighth. Which if it be true, it cannot be caused, but by the *Aire*, which then beginneth to *Condense*; And so turneth within that *Small Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath been observed, that *Tobacco*, *Cur*, and *Weighed*, and then *Dried* by the *Fire*, loseth *Weight*; and after being laid in the open *Aire*, recovereth *Weight* again. And it should seem, that as soon as ever the *River* beginneth to increase, the whole *Body* of the *Aire* thereabouts suffereth a *Change*: For (that which is more strange,) it is credibly affirmed, that upon that very Day, when the *River* first riseth, great *Plagues*, in *Cairo*, use suddenly to break up.

Experiments
in Consort,
touching
Sleep.

744

THose that are very *Cold*, and especially in their *Feet*, cannot get to *Sleep*. The *Cause* may be, for that in *Sleep* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For we see that in great *Colds*, one can scarce draw

draw his *Breath*. Another *Cause* may be, for that *Cold* calleth the *Spirits* to succour; and therefore they cannot so well close, and go together in the *Head*; which is ever requisite to *Sleep*. And for the same *Cause*, *Paine*, and *Noise* hinder *Sleep*; and *Darkness* (contrariwise) furthereth *Sleep*.

Some *Noises* (wherof we spake in the 112 *Experiment*) help *Sleep*; as the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cause* is, for that they move in the *Spirits* a gentle attention; and whatsoever moveth attention, without too much *Labour*, stilleth the *Natural* and *discurfiv*e *Motion* of the *Spirits*.

745

Sleep nourisheth, or at least preserveth *Bodies*, a long time, without other *Nourishment*. *Beasts* that *Sleep* in *Winter*, (as it is noted of *Wild-Bears*;) during their *Sleep* wax very fat, though they eat nothing. *Bats* have been found in *Ovens*, and other *Hollow* close *Places*, Matted one upon another; and therefore it is likely that they *Sleep* in the *Winter* time, and eat nothing. *Quare*, whether *Bees* do not sleep all *Winter*, and spare their *Honey*; *Butterflies*, and other *Flies*, do not only *Sleep*, but lie as dead all *Winter*; and yet with a little *Heat* of *Sunne*, or *Fire*, revive againe. A *Dormouse*, both *Winter* and *Summer*, will *Sleep* some dayes together, and eat Nothing.

746

To restore *Teeth* in *Age*, were *Magnale Nature*. It may be thought of. But howsoever, the *Nature* of the *Teeth* deserveth to be inquired of, as well as the other *Parts* of *Living Creatures Bodies*.

Experiment in Confort, touching *Teeth* and *Hard Substances* in the *Bodies* of *Living Creatures*.

747

There be *Five Parts* in the *Bodies* of *Living Creatures*, that are of hard *Substances*; the *Skull*; the *Teeth*; the *Bones*; the *Horns*; and the *Nails*. The greatest *Quantity* of *Hard Substance* continued, is towards the *Head*. For there is the *Skull* of one entire *Bone*; there are the *Teeth*; there are *Maxillary Bones*; there is the *hard bone*, that is the instrument of hearing, and thence issue the *Horns*: So that the *Building* of *Living Creatures Bodies*, is like the *Building* of a *Timber-House*, where the *walls*, and other *parts* have *Columns* and *Beams*; But the *Roofe* is in the better sort of *Houfes*, all *Tile*, or *Lead*: or *Stone*. As for *Birds*, they have three other hard *Substances* proper to them; The *Bill*, which is of the Like *Matter* with the *Teeth*; for no *Birds* have *Teeth*: the *Shel* of the *EGge*: and their *Quills*: for as for their *Spurre*, it is but a *Naile*. But no *Living Creatures*, that have *Shells* very hard; (as *Oysters*, *Cocles*, *Mustles*, *Shalops*, *Crabs*, *Lobsters*, *Cra-fish*, *Shrimps*, and especially the *Tortoise*;) have *Bones* within them, but only little *Gristles*.

Bones, after full growth, continue at a stay: and so doth the *Skull*, *Horns*, in some *Creatures*, are cast, and renewed: *Teeth* stand at a stay, except their wearing; as for *Nails*, they grow continually: and *Bills* and *Beaks* will overgrow, and sometimes be cast; as in *Eagles* and *Parrots*.

748

Most of the *Hard Substances* flie to the *Extremes* of the *Body*; as *Skull*, *Horns*, *Teeth*, *Nails*, and *Beaks*: Onely the *Bones* are more inward, and clad with *Flesh*. As for the *Entrailles*, they are all without *Bones*; save that a *Bone* is (sometimes) found in the *Heart* of a *Stag*; and it may be in some other *Creatures*.

749

The *Skull* hath *Brains*, as a kind of *Marrow*, within it. The *back-bone* hath one Kind of *Marrow*, which hath an *Affinity* with the *braine*; and other *bones* of the *body* have another. The *Jaw-bones* have no *Marrow* Severed, but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to

750

have a kind of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more then *Bloud*. *Horns* is alike throughout; and so is the *Nail*.

751 None other of the *Hard Substances* have *Sense*, but the *Teeth*: and the *Teeth* have *Sense*, not only of *Paine*, but of *Cold*.

But we will leave the Enquiries of other *Hard Substances*, unto their several Places; and now enquire only of the *Teeth*.

752 The *Teeth* are, in *Men*, of three Kinds: *Sharp*, as the *Fore-Teeth*; *Broad* as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; and *Pointed-Teeth*, or *Canine*, which are between both. But there have been some *Men*, that have had their *Teeth un-divided*, as of one whole *Bone*, with some little Marke in the place of the Division; as *Pyrrhus* had. Some *Creatures* have *Over-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tuskes*; as *Boares*, *Pikes*, *Salmons*, and *Dogs*, though lesse. Some *Living Creatures* have *Teeth* against *Teeth*, as *Men*, and *Horses*; and some have *Teeth*, especially their *Master Teeth*, indented one within another, like *Saves*; as *Lions*; and so againe have *Dogs*. Some *Fishes* have divers *Rowes of Teeth* in the *Rootes* of their *Mouthes*; as *Pikes*, *Salmons*, *Trouts*, &c. And many more in *Salt-waters*. *Snakes*, and other *Serpents* have *Venemous Teeth*; which are sometimes mistaken for their *Sting*.

753 No *Beasts* that hath *Horns*, hath *Upper Teeth*; and no *Beast*, that hath *Teeth*, above, wanteth them below: But yet if they be of the same kind it followeth not, that if the *Hard Matter* goeth not into *Upper Teeth*, it will goe into *Horns*; Nor yet è *converso*, For *Doe's*, that have no *Horns*, have no *Upper Teeth*.

754 *Horses* have, at three years old, a *Tooth* put forth, which they call the *Colts-Tooth*; and at four years old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; and that weareth shorter and shorter, every year, till that at eight years old, the *Tooth* is smooth, and the *hole* gone; and then they say; *That the Mark is out of the Horse's Mouth*.

755 The *Teeth of Men* breed first, when the *Child* is about a year and halfe Old; and then they cast them, and new come about seven years old. But divers have *Each-side-Teeth* come forth at twenty, yea, some at thirty, and forty. *Quere* of the manner of the *Coming* of them forth: They tell a tale of the old *Counesse of Desmond*, who lived till she was seventscore yeares old, that she did *Dentire* twice, or thrice; Casting her old *Teeth*, and others *Comming* in their Place.

756 *Teeth* are much hurt by *Sweet-meats*, and by *Painting* with *Mercury*; and by things over-hot; and by things over-cold; and by *Rhuemts*. And the pain of the *Teeth*, is one of the sharpest of Pains,

757 Concerning *Teeth*, these things are to be Considered. 1 The *Preserving* of them. 2 The *Keeping* of them *White*. 3 The *Drawing* of them with Least *Paine*. 4 The *Staying* and *Easing* of the *Tooth-ach*. 5 The *Binding* in of *Artificial Teeth*, where *Teeth* have been stricken out. 6 And last of all, that *Great One*, of *Restoring Teeth* in *Age*. The instances that give any likelihood of *Restoring Teeth* in *Age*, are, the Late *Comming* of *Teeth* in some; and the *Renewing* of the *Beaks* in *Birds*, which are *Commaterical* with *Teeth*. *Quere*, therefore more particularly how that *Commeth*. And again; the *Renewing* of *Horns*. But yet that hath not been known to have been provoked by art; Therefore let *trial* be made, whether *Horns* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they

they may be drcured to come *Larger* than usual; As to make an *Oxe* or a *Deer*, have a greater *Head of Horns*? And whether the *Head* of a *Deer*, that by age is more *Spitted*, may be brought again to be more *Branched*; For these *Trials*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and provoked. It may be tried also, whether *Birds* may not have something done to them when they are *Young*, wherby they may be made to have *Greater*, or *Longer Bills*; Or *Greater*, and *Longer Tallons*? And whether *Children* may not have some *Walsh*, or Something to make their *Teeth* Better, and Stronger? *Coral* is in use as an Help to the *Teeth* of *Children*.

SOME *Living Creatures* Generate but at certain *Seasons* of the Year; As *Deer*, *sheep*, *Wild-Coney*s, &c. And most Sorts of *Birds*, and *Fishes*: Others at any time of the *Yeare*, as *Men*; And all *Domestick* *Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The Cause of *Generation* at all *Seasons* seemeth to be *Fulness*: For *Generation* is from *Redundance*. This *Fulness* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*, Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all *Seasons*, are full of *Heat* and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deer* are a *Melancholy dry Creature*, as appeareth by their *Fearfulness*, and the *Hardness* of their *Flesh*. *Sheep* are a *Cold Creature*, as appeareth by their *Mildness*, and for that they seldom *drink*. Most sort of *Birds* are of a *dry Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulness of Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldom, being *Tame*, generate often; Which is, from *Warmth*, and *Fulness of Food*. We finde, that the *Time of Going to Rut* of *Deer* is in *September*; For that they need the whole *Summers* *Feed* and *Grafs*, to make them fit for *Generation*. And if *Rain* come *Early* about the *Middle of September*, they go to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheep*, in respect of their small *heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at certain *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat* and *Comfort* of the *Spring* prepareth them. There is also another Reason, why some *Creatures* generate at certain *Seasons*: And that is the *Relation* of their *Time of Bearing*, to the time of *Generation*: For no *Creature* goeth to generate, whilst the *Female* is full; Nor whilst she is bute in *Sitting*, or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Eggs* or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate again, three or four times, one after another.

Of *Living Creatures*; some are longer time in the *Womb*, and some *Shorter*. *Women* go commonly nine *Moneths*; The *Cow* and the *Ene* about six *Moneths*; *Dies* goe about nine *Moneths*, *Mares* eleven *Moneths*; *Bitches* nine *Weeks*; *Elephants* are said to go two *Years*; For the Received *Tradition* of ten *Yeares* is *Fabulous*. For *Birds* there is double *Enquiry*; The *distance* between the *Treading* or *Coupling*, and the *Laying* of the *Eggs*; And again, between the *Eggs Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds* there is less *Diversity of Time*, than amongst other *Creatures*, yet some there is: For the *Hen* sitteth but three *Weeks*; The *Turkey Hen*, *Goose*, and *Duck*, a *Moneth*: *Quare* of others. The *Cause* of the great *difference of Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *kind*,

Experiments
in Consort,
touching the
Generation
and Bearing of
living Crea-
tures in the
wombe.

758

759

Or from the *Constitution* of the *Womb*. For the former, those that are longer in coming to their *Maturity* or *Growth*, are longer in the *Womb*; As is chiefly seen in *Men*; And so *Elephants* which are long in the *Womb*, are long time in coming to their full *Growth*. But in most other *Kinds*, the *Constitution* of the *Womb*, (that is, the *Hardness*, or *Driness* thereof), is concurrent with the former *Cause*. For the *Colt* hath about four years of *Growth*, And so the *Fawn*; And so the *Calf*. But *Whelps*, which come to their *Growth* (commonly) within three *Quarters* of a year, are but nine *Weeks* in the *Wombe*. As for *Birds*, as there is less *Diversity*, amongst them in the time of their *Bringing forth*; So there is less *Diversity* in the time of their *Growth*; Most of them coming to their *Growth* within a *Twelve-Moneth*.

760

Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneys*, &c. Some (ordinarily) but *One*; As *Women*, *Lionesses*, &c. This may be caused, either by the *Quantity* of *Sperme* required to the *Producing* *One* of that *Kinde*; which it less be required, may admit greater *Number*; If more, fewer; Or by the *Partitions* and *Cels* of the *Wombe*, which may sever the *Sperme*.

Experiments
in Consort,
touching
Species visible.

761

There is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things* coloured. For like as a *Shilling*, in the *Bottom* of the *Water*, will shew greater; So will a *Candle* in a *Lantern*, in the *Bottom* of the *Water*. I have heard of a *Practice*, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* *Dive*th, having his *Eyes* open, and swimmeth upon his *Back*; whether (I say) he seeth *Things* in the *Aire*, greater or less. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *finer*, how it worketh I know not.

762

It would be well bouked out, whether great *Refractions* may not be made upon *Reflections*, as well as upon *Direct Beames*. For Example, We see, that take an *Empty Bason*, put an *Angel* of *Gold*, or what you will, into it; Then go so farre from the *Bason*, till you cannot see the *Angel*, because it is not in a *Right Line*; Then fill the *Bason* with *water*, and you shall see it out of his *Place*, because of the *Reflection*. To proceed therefore, put a *Looking-Glass* into a *Bason* of *water*; I suppose you shall not see the *Image* in a *right Line*, or at equal *Angles*, but aside. I know not whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glass*, Which for *Beauty* and *Strangeness*; were a fine proof: For then you shall see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cistern* or *Pool* of *water*, you shall place over against it a picture of the *Devill*, or what you will so as you do not see the *water*. Then put a *Looking-Glass* in the *water*: Now if you can see the *Devils* *Picture* aside, not seeing the *water*, it will look like a *Devil* indeed. They have an old *Tale* in *Oxford*, That *Friar Bacon* walked between two *Steeple*s: Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

Experiments
in Consort,
touching the
Impulsion, and
Percussion.

763

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth disperse the *Tor-pour* of *Solid Bodies*; Which beside their *Motion* of *Gravity*, have in them a *Natural Appetite*, not to move at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* upon which it resteth, a stronger

Com-

Compression of Parts, than it hath of it Self: And therefore needeth more Force to be put in *Motion*. For if a *Weighty Body* be Pensile, and hang but by a *Thread*, the *Percussion* will make an *Impulsion* very near as easily, as if it were already in *Motion*.

A *Body Over-great* or *Over-small*, will not be thrown so farre as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *proportion*, between the *Body Moved*, and the *Force*, to make it move well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moveth*, and the *Resistance* of the *Body* that is *Moved*: And if the *Body* be *too great*; it yieldeth *too little*; And if it be *too small*, it resisteth *too little*.

764

It is *Common Experience*, that no *Weight* will prefs or cut so strong, being laid upon a *Body*, as falling, or stricken from above. It may be the *Aire* hath some part in furthering the *Percussion*: But the chief *Cause* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulsion*, or by the *Motion* of *Gravity continued*, a *Compression* in them, as well downwards, as they have when they are thrown, or Shot thorow the *Air* forwards. I conceive also, that the quick loose of that *Motion*, preventeth the *Resistance* of the *Body* below; And *Priority* of the *Force*, (alwayes,) is of great *Efficacie*; As appeareth in infinite *Instances*.

765

Tickling is most in the *Soles* of the *Feet*, and under the *Arm-Holes*, and on the *Sides*. The *Cause* is, the *Thinness* of the *Skin* in those *Parts*; Joyned with the *Rareness* of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinness* of the *Skin*, and *Suddenness*, and *Rareness* of *Touch*, do further: For we see, a *Feather*, or a *Rush*, drawn along the *Lip* or *Cheek*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddenness*; We see no *Man* can Tickle himself: We see also that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not *Ticklish*, because it is accustomed to be *Touched*. *Tickling* also causeth *Laughter*. The *Cause* may be, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Tirillation*; For upon *Tickling*, we see there is ever a *Starting*, or *Shrinking*, away of the *Part*, to avoid it; And we see also, that if you *Tickle* the *Nostrils* with a *Feather*, or *Straw*, it procureth *Sneezing*. Which is a *Sudden Emission* of the *Spirits*, that do likewise expell the *Moisture*. And *Tickling* is ever *Painful*, and not well endured.

Experiment
Solitary touching
Tirillation.

766

It is strange, that the *River* of *Nilus*, Over-flowing, as it doth, the *Country* of *Egypt*, there should be nevertheless little or no *Rain* in that *Countrey*. The *Cause* must be, either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of *Both*. In the *Water*, it may be ascribed, either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*: Or elle to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *Waters* upon the *Fire* do vapour so much, after some time of *Boiling*, as at the first. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in *Taste*; And it is excellent Good for the *Stone*, and *Hypochondriacal Melancholy*; Which sheweth it is *Lenifying*; And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without *Shade*, either of *Woods* or *Hils*; Whereby the *Sun* must needs have great *Power* to *concoct* it. As for the *Aire*, (from whence I conceive this want of *Showrs* commeth chiefly;) The *Cause* must

Experiment
Solitary touching the
Scarcety of
Raine in
Egypt.

767

must be, for that the *Aire* is, of it self, *Thin* and *Thirsty*; And as soon as ever it getteth any *Moisture* from the *Water*, it im-bibeth, and dissipateth it, in the whole body of the *Air*; And suffereth it not to remain in *Vapour*; Whereby it might breed *Rain*.

Experiment
Solitary touch-
ing Clarifi-
cation.

768

IT hath been touched in the *Title* of *Perlocations*, (Namely, such as are *Inwards*;) that the *Whites* of *Eggs*, and *Milk*, do clarify; And it is certain that in *Egypt*, they prepare and clarify the water of *Nile*, by putting it into great *Jars* of *Stone*, and Stirring it about with a few Stamped *Almonds*; Wherewith they also besmear the Mouth of the *Vessel*; And so draw it off, after it hath rested some-time. It were good to try this *Clarifying* with *Almonds*, in *New Beer*, or *Must*, to hasten and perfect the *Clarifying*.

Experiment
Solitary touch-
ing Plants
without leaves

769

THEre be scarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*, except you allow *Coral* for one. But there is also in the *Desarts* of *S. Macario* in *Egypt*, a *Plant* which is Long, Leaf-les, Brown of Colour, and Branched like *Coral*, save that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth, and displayeth strangely; And the People thereabout have a Superstitious Belief, that in the *Labour* of *Women*, it helpeth to the *easie Deliverance*.

Experiment
Solitary touch-
ing the Ma-
terials of Glass.

770

THE *Chrystalline Venice Glass*, is reported to be a Mixture, in equal Portions, of *Stones*, brought from *Pavia*, by the River *Ticinum*, and the *ashes* of a weed called by the *Arabs Kall*, which is gathered in a *Desart* between *Alexandria*, and *Rosetta*; And is by the *Egyptians* used first for Fuel; And then they crush the *Ashes* into lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glass-works*.

Experiment
Solitary touch-
ing Prohibition
of Putrefaction,
and
the long Con-
servation of
Bodies.

771

IT is strange, and well to be noted, how long *Carkasses* have continued *Uncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Egypt*; Having lasted, as is conceived (some of them,) three thousand years. It is true, they finde Means to draw forth the *Brains*, and to take forth the *Entrails*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder: For we see, what a Soft and Corruptible Substance the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seem, that according to our *Observation*, and *Axiome*, in our hundredth *Experiments*, *Putrefaction*, which wee conceive to bee so *Natural* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that *Haste* to *Corruption*, that is conceived. And therefore *Bodies* in *Shining Amber*, in *Quick-silver*, In *Balmes*, (whereof we now speak,) In *Wax*, In *Honey*, In *Gummes*, And (it may be) in *Conservatories* of *Snow*, &c. are preserved very long. It need not go for Repetition, if we resume again that which wee said in the afore-said *Experiments*, concerning *Annihilation*; Namely, that if you provide against three Causes of *Putrefaction*, *Bodies* will not corrupt: The first is, that the *Aire* be Excluded; For that undermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolve it. The Second is, that the *Body* *Adjacent* and *Ambient*, be not *Com-material*, but meerly *Heterogeneous* towards the *Body* that is to be preserved: For if nothing can be received by the one, nothing can issue from the other; Such are *Quick-silver*, and *white Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserved, be not of that, *Gross*, that it may corrupt within it self, although no Part of it issue into the *Body* adjacent: And therefore it must be rather *Thin*, and

and *Small*, than of *Bulk*. There is a fourth Remedy also, which is; That if the *Body* to be preserved be of *Bulk*, as a *Corps* is, then the *Body* that incloseth it, must have a *Vertue* to draw forth, and dry the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of King *Numa*; It being some four hundred years after his *Death*: And the other, his *Books* of *Sacred Rites* and *Ceremonies*; and the *Discipline* of the *Pontifs*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be seen, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Books*, they were found as fresh, if they had been but newly *Written*; being written in *Parchment*, and covered over with *Watch-candles* of *Wax* three or four-fold. By this it seemeth, that the *Romans* in *Nama's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the cause that the *Body* was utterly consumed. But I find in *Plutarch*, and *Othees*, that when *Augustus Caesar* visited the *Sepulchre* of *Alexander the Great*, in *Alexndria*, hee found the *body* to keep his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which, no doubt, was of the best,) the *Body* was so *Tender*, as *Cesar* touching but the *Nose* of it, defaced it. Which maketh me find it very strange, that the *Egyptian Mummies* should be reported to be as hard as *Stone-pitch*: For I finde no difference but one; Which indeed, may be very *Material*; Namely, that the *Ancient Egyptian Mummies*, were shrowded in a *Number* of *Fold* of *Linnen*, besmeared with *Gums*, in manner of *Sear-cloth*; Which it doth not appear was practised upon the *Body* of *Alexander*.

Nere the *Castle* of *Catie*, and by the wels *Affan* in the *Land* of *Idumea*, a great Part of the way, you would think the *Sea* were neare hand though it a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, upon *Sea-Sands*; Such abundance of *Nitre* the *Shores* there do put forth.

Experiment Solitary touching the Abundance of Nitre in certain Sea-shores.

772

Experiment Solitary touching Bodies that are born up by water.

773

The *Dead Sea*, which vomiteth up *Bitumen* is of that *Crafitude*, as *Living Bodies* bound hand and Foot, cast into it, have been born up, and not sunk. Which sheweth, that all sinking into *Water*, is but an *Overweight* of the *Body*, put into the *Water*, in respect of the *Water*; So that you may make *Water* so strong, and heavy, of *Quick-silver*, (perhaps) or the like, as may bear up *Iron*: Of which I see no Use, but *Imposture*. Wee see also, that all *Metals* except *Gold*, for the same reason swim upon *Quick-silver*.

It is reported, that at the *Foot* of a *Hill* near the *Mare Mortuum*, there is a *black Stone* (whereof *Pilgrims* make *Fires*), which burneth like a *Coal*, and diminisheth not; But only waxeth *Brighter* and *Whiter*. That it should do so, is not strange; For we see *Iron Red Hot* burneth, and consumeth not. But the *Strangeness* is, that it should continue any time so: For *Iron*, as soon as it is out of the *Fire*, deadeth straight wayes. Certainly, it were a *Thing* of great *Use*, and *Profit*, if you could finde out *Fuel*, that would burn *Hot*, and yet last long: neither am I altogether *Incredulous*, but there may be such *Candles*, as, they say, are made of *Salamanders Wool*; Being a kind of *Mineral*, which whiteneth also in the *Burning*, and consumeth not. The *Question* is this; *Flame* must be made of somewhat; And commonly it

Experiment Solitary touching Fuel that consumeth little, or nothing

774

is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps; that it should be made of *Spirit*, or *Vapour*, in a *Body*, (which *Spirit* or *Vapour* hath no *Weight*,) such as is the matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oile*, and *Wax*, and other *Candle-stuffe*, the *Flame* may continue, and the *Wicke* not burnt.

Experiment
Solitary Occo-
nomicall touch-
ing cheape
Fuel.

775

Sea-Coale last longer than *Char-Coale*; And *Char-Coale* of *Roots*, being Coaled into great *Peeces*, last longer than Ordinary *Char-Coale*. *Turfe* and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Small-coale*, or *Char-coal* poured upon *Char-coale*, make them last longer. *Sedge* is a cheap *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Trial would be made of some Mixture of *Sea-coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-coale-Men* use it, privily, to make the *Bulke* of the *Coale* greater, it is Deceit; But if it be used purposely, and be made knowne, it is Saving.

Experiment
Solitary touch-
ing the
Gathering of
winds for
Freshnesse.

776

IT is, at this Day, in use in *Gaza*, to couch *Pot-sheards* or *Vessels* of *Earth*, in their *Walls*, to gather the *Wind* from the *Top*, and to passe it downe in *Spouts* into *Roomes*. It is a Device for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italy*, and *Spaine* for *Freshnesse*, and gathering the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *Winds*, and *Enlarging* them againe, and making them *Reverberate*, and goe *Round in Circles*, rather than this *Device* of *Spouts* in the *Wall*.

Experiment
Solitary touch-
ing the
Trials of *Airs*.

777

THere would be used much diligence, in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discover the *Wholesomenesse*, or *Unwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Constitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discovery*; For they serve for a *Natural Divination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

Experiment
Solitary touch-
ing *Increas-
ing* of *Milke*
in *Milch*
Beasts.

778

THere is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattle* drinke; Which maketh them give more *Milke*. Surely, there would be some better *Trialls* made of *Mixtures* of *Water* in *Ponds* for *Cattle*, to make them more *Milch*; Or to *Fatten* them; Or to *Keep* them from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the best.

Experiment
Solitary touch-
ing *Sand*
of the Nature
of *Glasse*.

779

IT is reported, that in the *Valley*, near the *Mountaine Carmel*, in *Judea*, there is a *Sand*, which, of all other, hath most *Affinitie* with *Glasse*. In somuch as other *Mineralls*, laid in it, turne to a *Glassie Substance*, without the *Fire*; And againe *Glasse* put into it, turneth into the *Mother-Sand*. The Thing is very strange, if it be true: And it is likeliest to be Caused by some *Natural Furnace*, of *Heat* in the *Earth*: And yet they doe not speak of any *Eruption* of *Flames*. It were good to trie in *Glasse-works*, whether the *Crude Materialls* of *Glasse*, mingled with *Glasse*, already made and Re-moulten, doe not facilitate the *Making* of *Glass* with lesse *heat*.

IN the *Sea*, upon the *South-West* of *Sicily*, much *Coral* is found. It is a *Sub-Marine Plant*. It hath no *Leaves* It brancheth onely when it is under *Water*; It is *Soft*, and *Green* of *Colour*; But being brought into the *Aire*, it becommeth *Hard* and *Shining Red*, as we see. It is said also, to have a *White Berry*, But we find it not brought over with the *Coral*. Belike it is cast away as nothing worth: Inquire better of it, for the *Discovery* of the *Nature* of the *Plant*.

Experiment Solitary touching the Growth, of Coral.

780

THe *Manna* of *Calabria* is the best, and in most Plenty. They gather it from the *Leaf* of the *Mulberry-Tree*; But not of such *Mulberry-Trees*, as grow in the *Valley's*. And *Manna* falleth upon the *Leaves* by *Night*, as other *Dew's* doe. It should seem, that before those *Dew's* come upon *Trees* in the *Valley's*, they dissipate and cannot hold out. It should seem also, the *Mulberry-leaf*, it self hath some *Coagulating Vertue*, which inspissareth the *Dew*, for that it is not found upon other *Trees*: And we see by the *Silk-Worm*, which feedeth upon that *Leaf*, what a dainty *Smooth Juice* it hath; and the *Leaves* also, (especially of the *Black Mulberry*,) are somewhat *Bristly*, which may help to preserve the *Dew*. Certainly, it were not amiss, to observe a little better, the *Dew's* that fall upon *Trees*, or *Herbs*, Growing on *Mountains*: For it may be, many *Dew's* fall, that spend before they come to the *Valley's*. And I suppose, that he that would gather the best *May-Dew* for *Medicine*, should gather it from the *Hills*.

Experiment Solitary touching the Gathering of Manna.

981

IT is said, they have a manner, to prepare their *Greek-Wines*, to keep them from *Fuming*, and *In-ebriating*, by adding some *Sulphur*, or *Allome*: Whereof the one is *unctuous*, and the other is *Astringent*. And certain it is, that those two *Natures* do represe the *Fumes*. This *Experiment* would be transferred unto other *Wine* and *Strong Beer*, by Putting in some like *Substances*, while they work; Which may make them both to *Fume* less, and to *Inflame* less.

Experiment Solitary touching the Correcting of wine.

782

IT is conceived by some, (not improbably,) that the reason, why *Wilde-Fires* (Whereof the principal Ingredient is *Bitumen*,) do not quench with *Water*, is, for that the first *Concretion* of *Bitumen*, is a *Mixture*, of a *Fierry*, and *Watry Substance*: So is not *Sulphur*. This appeareth, for that in the Place near *Puteoli*, which they call the *Court* of *Vulcan*, you shall hear under the *Earth* a *Horrible Thundring* of *Fire*, and *Water*, conflicting together: And there break forth also *Spouts* of *Boiling Water*. Now that place yieldeth great *Quantities* of *Bitumen*; Whereas *Atræa*, and *Vesuvius*, and the like, which consist upon *Sulphur*, shoot forth *Smoake*, and *Asbes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* mingled with *Lime*, and put under *Water*, will make, as it were, an *artificial Reck*, The *Substance* becometh so *Hard*.

Experiment Solitary touching the Materials of wilde-Fire.

783

THere is a *Cement*, compounded of *Flower*, *Whites of Eggs*, and *Stone powdered*, that becommeth *Hard* as *Marble*; wherewith *Piscina Mirabilis*, near *Cuma*, is said to have the *Walls Plastered*. And it is certain, and tried, that the *Powder* of *Loadstone*, and *Flint* by the *Addition* of *Whites of Eggs*, and *Gum-Dragon*, made into *Paste*, will in a few *dayes* harden to the *Hardness* of a *Stone*.

Experiment Solitary touching Plaster growing as hard as Marble

784

It

Experiment
Solitary tou-
ching judg-
ment of the
Cure in some
Ulcers and
Hurts.

785

IT hath been noted by the *Ancients*, that in *Full*, or *Impure Bodies*; *Ulcers* or *Hurts* in the *Leggs*, are Hard to Cure; And in the *Head* more easie. The *Cause* is, for that *Ulcers* or *Hurts* in the *Legges* require *Desiccation*; which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Ulcers* in the *Head* require it not; But contrariwise *Drienes* maketh them more apt to Consolidate. And in Modern Observation the like difference hath been found, between *French-men*, and *English-men*; whereof the ones *Constitution* is more *Dry* and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-man*, and of the *Legg* in an *English-man*.

Experiment
Solitary tou-
ching the
Healthfulness
or unhealth-
fulness of the
Southern-wind

786

IT hath been noted by the *Ancients*, that *Southern Winds*, blowing much; without *Rain*, do cause a *Fevourous* Disposition of the *Yeare*; But with *Rain*, not. The *Cause* is, for that *Southern-Winds* doe, of themselves, qualifie the *Aire*, to be apt to cause *Fevers*; But when *Showers* are joyned, they do Refrigerate in Part, and Check the Sultry *Heat* of the *Southern-Winde*. Therefore this holdeth not in the *Sea-Coasts*, because the *vapour* of the *Sea* without *Showers*, doth refresh.

Experiment
Solitary tou-
ching Wounds.

787

IT hath been noted by the *Ancients*, that *Wounds* which are made with *brass*, heal more easily, than *Wounds* made with *Iron*. The *Cause* is, for that *Brass* hath, in itself, a *Sanative* Vertue; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosive*, and not *Sanative*. And therefore it were good that the *Instruments* which are used by *Chirurgions* about *wounds* were rather of *Brass*, than *Iron*.

Experiment
Solitary tou-
ching Mortifi-
cation by cold.

788

IN the *Cold Countries*, when *Mens Noses* and *Eares* are mortified, and (as it were) *Gangrened* with *Cold*, if they come to a *Fire*, they rot off presently. The *cause* is, for that the few *Spirits*, that remain in those *Parts*, are suddenly drawn forth, and so *Pusification* is made *Compleat*. But *Snow* put upon them helpeth; For that it preserveth those *Spirits* that remain, till they can revive; And besides, *Snow* hath in it a secret *warmth*: As the *Monk* proved out of the *Text*, *Qui dat Nivem sicut Lanam, Gelu sicut Cineres spargit*. Whereby he did infer, That *Snow* did warm like *Wool*, and *Frost* did fret like *Albes*, *warm Water* also doth good; Because by little and little it openeth the *Pores*, without any sudden *Working* upon the *Spirits*. This *Experiment*, may be transferred unto the *Cure* of *Gangrenes*, either coming of themselves, or induced by too much applying of *Opiates*: Wherein you must beware of *Dry Heat*, and resort to things that are *Refrigerant*, with an *Inward warmth* and *Vertue* of *Cherishing*.

Experiment
Solitary tou-
ching weight.

789

WEigh *Iron*, and *Aqua-Fortis*, severally; Then dissolve the *Iron* in the *Aqua-Fortis*: And weigh the *Dissolution*; And you shall finde it to bear as good *Weight*, as the *Bodies* did severally: Notwithstanding a good deal of *Waste*, by a thick *vapour*, that issueth during the *Working*: Which sheweth that the *Opening* of a *Body*, doth increase the *weight*. This was tried once or twice, but I know not whether there were any *Errour*, in the *Trial*.

Experiment
Solitary tou-
ching the Su-
per-Natation
of Bodies.

790

TAke of *Aqua-Fortis* two *Ounces*, of *Quick-silver* two *Drachmes*, (For that *Charge* the *Aqua-Fortis* will bear;) The *Dissolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the increasing of the *weight* of wa-
ter

ter will increase his Power of Bearing; as we see *Broine*, when it is Salt enough, will bear a *Edge*. And I remember well a *Physician*, that used to give some *Mineral Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get down so easily, as in Ordinary Water. But it seemeth, the weight of the *Quick-silver*, more than the *Weight* of a *Stone*; doth not compensate the *Weight* of a *Stone*, more than the *Weight* of the *Aqua fortis*.

Let there be a *Body* of *Unequal weight*; (As of *Wood* and *Lead*, or *Bone* and *Lead*;) if you throw it from you with the *Light-End* forward, it will turne, and the *Weightier End* will recover to be forwards; Unlessie the *Body* be *Over-long*. The *Cause* is, for that the more *Dense Body*, hath a more *Violent Pressure* of the *Parts*, from the first *Impulsion*; Which is the *Cause* (though heretofore not found-out, as hath been often said,) of all *Violent Motions*: And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure* of *Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turn over: For (turned) it can more easily draw forward the *Lighter Part*. *Gallileus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driven faster then the *Water* can follow, the *Water* gathereth upon an heap, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runneeth the *Water*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure* of *Parts*, it appeareth manifestly in this, That if you take a *Body* of *Stone* or *Iron*, and another of *Wood*, of the same *Magnitude*, and *Shape*, and throw hem with equal *Force*, you cannot possibly throw the *Wood*, so farre, as the *Stone*, or *Iron*.

It is certain, (as it hath been formerly, in part touched,) that *Water* may be the *Medium* of *Sounds*, If you dash a *Stone* against a *Stone* in the *Bottom* of the *Water*, it maketh a *Sound*. So a long *Pole* struck upon *Gravel*, in the *Bottom* of the *Water*, maketh a *Sound*. Nay, if you should think that the *Sound* cometh up by the *Pole*, and not by the *Water*, you shall find that a *Anchor* let down by a *Rope*, maketh a *Sound*; And yet the *Rope* is no *Solid Body*, whereby the *Sound* can ascend.

All *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horror*. For *Sounds* we see that the *Grating* of a *Saw*, or any very *Harsh Noise*; will set the *Teeth* on edge, and make all the *Body* *Shiver*. For *Tastes* we see, that in the *Taking* of a *Potion*, or *Pills*, the *Head*, and the *Neck*, shake. For *Odious Smells* the like *Effect* followeth, which is lesse perceived, because there is a *Remedy* at hand, by *Stopping* of the *Nose*: But in *Horses*, that can use no such *Help*, we see the smell of a *Carrion*, especially of a *Deaf Horse*, maketh them fly away, and take on, almost as if they were *Mad*. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilneß* or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious Object*, *Comming* into *Sudden Darkneß*, induceth an *Offer* to *Shiver*.

Here is, in the *City* of *Ticinum* in *Italy*, a *Church*, that hath *Windowes* onely from above: It is in *Length* an *Hundred Feet*, in *Breadth* *Twenty Feet*, and in *Height* neer *Fifty*, Having a *Door* in the *Middest*. It reporteth

Experiment
Solitary touching the
Flying of Unequal bodies in the Air.

791

Experiment
Solitary touching water, that it may be the Medium of Sounds.

792

Experiment
Solitary of the Flight of the Spirits upon Odious objects.

793

Experiment
Solitary touching the Super-Reflexions of Echo's.

794

porteth the Voice, twelve or thirteen times, if you stand by the Close *End-wal*, over against the *Door*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Point-Charenton*, doth. And the Voice soundeth, as if it came from above the *Door*. And if you stand at the *Lower End*, or on either *Side* of the *Door*, the *Eccho* holdeth; But if you stand in the *Door*, or in the *Middlest* just over against the *Door*, not. Note, that all *Eccho's* found better against *old walls*, than *New*; Because they are more *Dry* and *hollow*.

Experiment
Solitary touching the
Force of Imagination, Imi-
nating that of the Sense.

795

Those Effects, which are wrought by the *Percussion* of the *Sense*, and by *Things in Fact*, are produced likewise in some degree, by the *Imagination*. Therefore if a Man see another eat *Sour* or *Acide Things*, which set the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that seeth the *Thing* done by another, hath his own *Teeth* also set on edge. So if a Man see another turn swiftly, and long; Or if he look upon *Wheels* that turne, Himselfe waxeth *Turn-sick*. So if a Man be upon an *High Place*, without *Rails*, or good *Hold*, except he be used to it, he is *Ready to Fall*: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, themselves are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment
Solitary touching Preser-
vation of Eo-
dies.

796

Take a *Stock-Gilly-Flower*, and tie it gently upon a *Sticke*, and put them both into a *Stoop-Glasse*, full of *Quick-silver*, so that the *Flower* be covered: Then lay a little *Weight* upon the *Top* of the *Glasse*, that may keep the *Sticke* down; And look upon them after four or five dayes; And you shall find the *Flower* *Fresh*, and the *Stalk* *Harder*, and lesse *Flexible*, than it was. If you compare it with another *Flower*, gathered at the same time, it will be the more manifest. This sheweth that *Bodies* doe preserve excellently in *Quick-silver*, and not preserve only, but, by the *Coldness* of the *Quick-silver*, *Indurate*; For the *Freshness* of the *Flower*, may be meerly *Conservation*; (which is the more to be observed, because the *Quick-silver* presseth the *Flower*;) But, the *Stiffness* of the *Stalk*, cannot be without *Induration*, from the *Cold* (as it seemeth,) of the *Quick-silver*.

Experiment
Solitary touching the
Growth, or
Multiplying of
Metalls.

797

It is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kind* of *Iron*, that being cut into *Little Pieces*, and put into the *Ground*, if it be well *Watered*, will increase into *Greater Pieces*. This is certaine, and known of *Old*; That *Lead* will multiply, and Increase, As hath been seen in *Old Statues* of *Stone*, which hath been put in *Cellars*; The *Feet* of them being bound with *Leaden bands*; Where (after a time) there appeared, that the *Lead* did swell; Infomuch as it hanged upon the *stone* like *Warts*.

Experiment
Solitary touching the
Drowning of
the more Base
Metal in the
more Precious.

798

Call *drowning* of *Metals*, when that the *Baser Metal*, is so incorporat with the more *Rich*, as it can by no Means be separated againe: which is a kind of *Version*, though *False*. As if *Silver* should be in inseparably incorporated with *Gold*. Or *Copper*. and *Lead*, with *Silver*. The Ancient *Electrum* had in it a fifth of *Silver* to the *Gold*; And made a *Compound Metal*, as fit, for most uses, as *Gold*; and more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe privily, or to make the *Compound* passe for the *Rich Metal* Simple, is an *Adulteration*, or *Counterfeiting*: But if it be done avowedly, and without *Disguizing*, it may be a great Saving of the *Richer Metal*. I remember to have heard of a Man skilfull in *Metals*, that a *Fifteent* Part of *Silver*, incorporat with

Gold,

Gold, will not be Recovered by any *Water of Separation*; Except you put a Greater *Quantity of Silver*, to draw to it the *Lesse*; which (he said) is the last *Refuge in Separations*. But that is a tedious way, which no *Man* (almost) will think on: This would be better enquired; And the *Quantity* of the *Fifteenth* turned to a *Twentieth*; And likewise with some little *Additional*, that may further the *Intrinsic Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metal*), will not be detected; If you take so much the more *Silver*, as will countervail the *Over-Weight* of the *Lead*.

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficultie. The *Melting* sheweth that it is not *Jeune*, or *Scarce* in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equal Spreading* of the *Tangible Parts*, and the *Close Coacervation* of them: Whereby they have the lesse *Appetite*, and no *Meanes* (at all) to issue forth. It were good therefore to try, whether *Glass Re-molten* do leese any *Weight*? For the *Parts* in *Glasse* are evenly *Spred*; But they are not so *Close* as in *Gold*; As we see by the *Easie Admission* of *Light*, *Heat*, and *Cold*; And by the *Smallnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As we see in the *Stuffe*, whereof *Coppels* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Causes of Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Close-nesse* of the *Tangible Parts*; And the *Jeunenesse*, or *Extream Comminution* of *Spirits*: of which *Three*, the two *First* may be joyned with a *Nature Liquefiable*; The *Last* not.

It is a *Profound Contemplation*, in *Nature*, to consider of the *Emptinesse*, (as we may call it,) or *Insatisfaction* of several *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it with a kind of *Thirst*, as not satisfied with his own former *Consistence*; For else it would never receive them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receive *Drie* and more *Terrestrial Bodies*, *Proportionable*: And *Drie Bodies*, on the other side, drink in *Waters* and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Vatry Substances*,) *One is a Glue to another Parchment, Skins, Cloth, &c.* drink in *Liquours*: though themselves be *Entire Bodies*, and not *Comminuted*, as *Sand*; and *Ashes*; Not apparently *Porous*: *Metals* themselves doe receive in readily *Strong-Waters*; And *Strong-waters* likewise doe readily pierce into *Metals*, and *Stones*: And that *Strong-Water* will touch upon *Gold*, that will not touch upon *Silver*; And *Converso*. And *Gold*, which seemeth by the *Weight*, to be the *Closest*, and most *Solid Body*, doth greedily drink in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not *Violent*: For it is (many times) *Reciprocal*, and as it were with *Consent*. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentively; For as for the *Pretty Assertion*, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *VVandering Notion*. Onely *Flame* doth not content it self to take in any other *Body*; But either to overcome and turn another *Body* into it self, as by *Victory*; Or it self to dye, and goe out.

Experiment Solitray touching Fixation of Body.

799

Experiment Solitary touching the Restlesse Nature of Things in Themselves and their Desire to change.

800





NATURALL HISTORY:

IX. Century.



IT is certain, that all *Bodies* whatsoever though they have no *sense*, yet they have *Perception*: For when one *Body* is applyed to another, there is a *Kind of Election*, to embrace that which is *Agreeable*, and to exclude or expel that which is *Ingrate*: And whether the *Body* be *Alterant*, or *Altered*, evermore a

Perception proceedeth *Operation*: For else all *Bodies* would be alike *One to Another*. And sometimes this *Perception*, in some *Kind of Bodies*, is far more *Subtil* than the *sense*; So that the *sense* is but a dull thing in *Comparison* of it: We see a *Weather-Glass*, will find the least difference of the *Weather*, in *Heat*, or *Cold*, when men find it not. And this *Perception* also, is sometimes at *Distance*, as well as upon the *Touch*, as when the *Load-Stone* draweth *Iron*; or *Flame* fireth *Naptha* of *Babylon*, a great distance of, It is therefore a *Subject* of a very *Noble Enquiry*, to enquire of the more *subtil Perceptions*; For it is another *Key* to open *nature* as well as the *sense*; and sometimes better. And besides, it is a *Principal Means* of *natural Divination*; For that which in these *Perceptions* appeareth early, in the great *effects* commeth long after. It is true also, that it serveth to *discover* that which is *hid*, as well as to

Experiments
in Consort
touching *Per-
ception* in *Bod-
ies Insensible*,
tending to
*Natural Divi-
nation*, or,
Subtil Trials.

fore-tel that which is to Come ; As it is in many Subtil Trials ; As to try whether Seeds be old or new , the sense cannot inform : But if you boil them in Water , the new seeds will sprout sooner : And so of Water , the Taste will not discover the best Water ; but the speedy consuming of it , and many other Means , which we have heretofore set down will discover it . So in all Physiognomy , the Lineaments of the Body will discover those Natural Inclinations of the Minde , which dissimulation will conceal , or Discipline will suppress . We shall therefore now handle onely , those two Perceptions , which pertain to Natural Divination , and Discovery : Leaving the Handling of Perception in other things to be disposed elsewhere . Now it is true , that Divination is attained by other Means ; As if you know the Causes ; If you know the Concomitants : you may judge of the Effect to follow : And the like may be said of Discovery ; But we tie our Selves here , to that Divination and Discovery chiefly , which is caused by an Early or subtil Perception .

The Aptness or Propension of Aire , or Water , to Corrupt or Putrifie , (no doubt ,) is to be found before it break forth into manifest Effects of Diseases , Blasting , or the like . We will therefore set down some Prognosticks of Pestilential and Vn-wholesome Yeares .

801 The Wind blowing much from the South , without Raine ; And Wormes in the Oake-Apple , have been spoken of before . Also the Plenty of Frogs , Grasshoppers , Flies , and the like creatures bred of Putrefaction , doth portend Pestilential Yeares .

802 Great , and Early Heats in the Spring , (and namely in May ,) without Winds , portend the same , And generally so doe Yeares with little Wind , or Thunder .

803 Great Droughts in Summer , lasting till towards the End of August , and some Gentle Showers upon them ; And then some Drie Weather again ; Doe portend a Pestilent Summer , the Year following : for about the End of August , all the Sweetness of the Earth , which goeth into Plants or Trees , is exhaled ; (And much more if the August be drie ;) So that nothing then can breath forth of the Earth , but a grosse Vapour , which is apt to Corrupt the Aire : And that Vapour , by the first Showers , if they be Gentle , is released , and cometh forth abundantly . Therefore they that come abroad soon after those Showers , are commonly taken with sickness . And in Astrick , no Body will stirre out of doores , after the first Showers . But if the first Showers come vehemently , then they rather wash and fill the Earth , than give it leave to breath forth presently . But if Dry Weather come againe , then it fixeth and continueth the corruption of the Aire , upon the first Showers begun ; And maketh it of ill Influence , even to the Next Summer ; Except a very Frostie Winter discharge it ; Which seldome succeedeth such Droughts .

804 The Lesser Infections , of the Small Pocks , Purple Feavers , Agues , in the Summer

mer Precedent, and hovering all winter, do portend a great Pestilence in the Summer following; For Putrefaction doth not rise to his height at once.

It were good to lay a Piece of Raw Flesh, or Fish, in the Open Aire; And if it Putrefie quickly, it is a Signe of a Disposition in the Aire to Putrefaction. And because you cannot be informed, whether the Putrefaction be quick or late, except you compare this Experiment with the like Experiment in another Year, it were not amisse in the same Year, and at the same Time, to lay one Piece of Flesh, or Fish, in the Open Aire, and another of the same Kind and Bignesse, within Doores: For I judge, that if a general Disposition, be in the Aire to Putrefie, the Flesh, or Fish, will sooner Putrefie abroad, where the Aire hath more power, than in the House, where it hath lesse, being many wayes corrected. And this Experiment would be made about the End of March: For that Season is likest to discover, what the Winter hath done, And what the Summer following will doe upon the Aire. And because the Aire (no doubt) receiveth great Tincture, and Infusion from the Earth; It were good to try that Exposing of Flesh, or Fish, both upon a Stake of Wood, some height above the Earth, and upon the Flat of the Earth.

805

Take May-Dew, and see whether it putrefie quickly, or no? For that likewise may disclose the Quality of the Aire, and Vapour of the Earth, more or lesse Corrupted,

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A Dry March, and a Dry May, portend a Wholsome Summer, if there be a Showring April between: But otherwise, it is a Signe of a Pestilential Year.

807

As the Discovery of the Disposition of the Aire, is good for the Prognosticks of Wholesome, and Un-wholesome Yeares; So it is of much more use, for the Choice of Places to dwell in: At the least, for Lodges, and Retiring Places for Health; (for Mansion Houses respect Provisions, as well as Health;) Wherein the Experiments above-mentioned may serve.

808

But for the Choice of Places, or Seats, it is good to make Tryal, not onely of aptness of Aire to corrupt, but also of the Moisture and Driness of the Aire; and the Temper of it, in Heat or Cold; For that may concern Health diversly. We see that there be some Houses, wherein Sweet Meats will relent, and Baked Meats will mould, more than in others; And Wainscots will also sweate more; so that they will almost run with water: All which, (no doubt) are caused chiefly by the Moistness of the Aire, in those Seats. But because it is better to know it, before a Man buildeth his House, than to find it after, take the Experiments following.

809

Lay wool, or a Sponge, or Bread, in the Place you would try, comparing it with some other Places; and see whether it doth not moisten, and make the wool, or Sponge, &c. more Ponderous, than the other? And if it do, you may judge of that Place, as Situate in a Gross and Moist Aire.

810

Because it is certain, that in some Places, either by the Nature of the Earth, or by the Situation of Woods, and Hills, the Aire is more Unequal, than in Others; And Inequality of Aire is ever an Enemy to Health; It were good to take two Weather-Glasses, Matches in all things, and to set them, for the same Hours of One day, in several places, where no Shade is, nor Enclosures: And to mark when you set them, how farre the Water commeth; And to compare them, when you come againe, how the Water standeth then: And if you finde them Unequal, you may be sure that the Place where the Water is lowest, is in the Warmer Aire, and the other in the Colder. And the greater the Inequality be, of the Ascent, or Descent of the Water, the greater is the Inequality of the Temper of the Aire.

811

- 812 The *Predictions* likewise of *Cold* and *Long Winters*, and *Hot* and *Drie Summers*, are good to be known; As well for the *Discovery* of the *Causes*, as for divers *Provisions*. That of *Plenty* of *Haws* and *Heps*, and *Briar-Berries*, hath been spoken of before. If *Wainscot*, or *Stane*, that have used to *Sweat*, be more dry in the *Beginning* of *Winter*; Or the *Drops* of the *Eaves* of *Houſes* come more slowly down, than they use; it portendeth a *Hard* and *Froſty Winter*. The *Cause* is, for that it sheweth an *Inclination* of the *Aire*, to *Drie Weather*; which in *Winter* is ever joyned with *Frost*.
- 813 Generally, a *Moist* and a *Cool* *Summer*, portendeth a *Hard Winter*. The *Cause* is, for that the *Vapours* of the *Earth*, are not dissipated in the *Summer*, by the *Sunne*; And so they re-bound upon the *Winter*.
- 814 A *Hot* and *Dry Summer*, and *Autumn*, and especially if the *Heat* and *drought* extend far into *September*, portendeth an *Open Beginning* of *Winter*, and *Colds* to succeed, toward the latter Part of the *Winter*, and the *Beginning* of the *Spring*: For till then, the former *Heat* and *Drought* beare the *Sway*; and the *Vapours* are not sufficiently Multiplied.
- 815 An *Open* and *Warm Winter* portendeth a *Hot* and *Dry Summer*: For the *Vapours* disperse into the *Winter Showers*; Whereas *Cold* and *Frost* keepeth them in, and transpotteth them into the late *Spring*, and *Summer* following.
- 816 *Birds* that use to change *Countries* at certaine *Seasons*, if they come *Earlier*, doe shew the *Temperature* of *Weather*, according to that *Country* whence they came: As the *Winter-Birds*, (namely, *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northern Countries*, with us shew *Cold Winters*. And if it be in the same *Country*, then they shew a *Temperature* of *Season*, like unto that *Season* in which they come: As *Swallowes*, *Batts*, *Cuckoes*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.
- 817 The *Prognosticks*, more *Immediate*, of *Weather* to follow soon after, are more *Certain* than those of *Seasons*. The *Resounding* of the *Sea*, upon the *Shore*; And the *Murmur* of *Winds* in the *Woods*, without apparent *Winds*, shew *Wind* to follow: For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceived, except they be pent, by *Water* or *Wood*. And therefore a *Murmur* out of *Caves* likewise portendeth as much.
- 818 The *Upper Regions* of the *Aire*, perceive the *Colleſion* of the *Matter*, of *Tempest*, and *Winds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following, And of this kind you shall find a *Number* of *Instances* in our *Inquisition de Ventis*.
- 819 *Great Mountains* have a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valleys* or *Plains* below: And therefore they say in *wales*, when certaine *Hills* have their *Night-Caps* on, they mean *Mischiefe*. The *Cause* is, for that *Tempests*, which are for the most part bred above, in the *Middle Region*, (as they call it,) are soonest perceived to collect in the *Places* next it.
- 820 The *Aire*, and *Fire*, have *Subtil Perceptions* of *Wind Rising*, before *Men* find it. We see the *Trembling* of a *Candle* will discover a *Wind*, that otherwise we do not feel: And the *Flexious Burning* of *Flames* doth shew the *Aire* beginneth to be unquiet: And so doe *Coales* of *Fire* by casting off the *Ashes* more then they use. The *Cause* is, for that no *Wind*, at the first, till it hath strook, and driven the *Aire*, is apparent to the *Sense*: But flame is easier to move, than *Aire*: And for the *Ashes*, it is no marvell, though *Wind* un-perceived shake them off; For we usually try, which way the *Wind* bloweth,

bloweth, by casting up *Grasse*, or *Ghaffe*, or such light things into the *Aire*.

When *Wind* expireth from under the *Sea*; as it causeth some *Resoundings* of the *Water*; (whereof we spake before,) so it causeth some *Light Motions* of *Bubbles*, and *white Circles of Froth*. The *Cause* is, for that the *Wind* cannot be perceived by the *Sense*, untill there be an *Eruption* of a great *Quantity*, from under the *Water*; And so it getteth into a *Body*: Whereas in the first *Putting up* it commeth in little *Portions*.

821

We spake of the *Ashes*, that *Coalesc* off, And of *Grasse*, and *Chasse* carried by the *Wind*: So any *Light Thing* that moveth, when we find no *Wind*, sheweth a *Wind* at hand: As when *Feathers*, or *Down* of *Thistles*, fly to and fro in the *Aire*.

822

For *Prognosticks* of *Weather* from *Living Creatures*, it is to be noted; That *Creatures* that live in the *Open Aire*, (*Sub Dio*) must needs have a *Quicker Impression* from the *Aire*, than *Men* that live most within *Doores*; And especially *Birds* who live in the *Aire*, freest, and clearest; and are aptest by their *Voice* to tell *Tales*, what they finde; and likewise by the *Motion* of their *Flight* to expresse the same.

Water-Fowls. (as *Sea-Gulls*- *Moore-Hens*, &c.) when they flock and fly together, from the *Sea* towards the *Shores*; And contrariwise, *Land Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both *Kindes* takes in the *Moistnesse*, and *Density* of the *Aire*: And so desire to be in *Motion*, and upon the *Wing*, whithersoever they would otherwise goe: For it is no *Marvel* that *Water-Fowls* doe joy most in that *Aire*, which is likest *Water*; And *Land-Birds*, also, (many of them) delight in *Bathing*, and *Moist Aire*. For the same *Reason* also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seem to call upon *Raine*: All which is but the *Comfort* they seem to receive in the *Relenting* of the *Aire*.

823

The *Heron*, when she soareth high, (so as sometimes she is seen to passe over a *Cloud*;) sheweth *Winds*: But *Kites* flying aloft, shew *Faire* and *Dry weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that *Temper*, wherein they delight: And the *Heron*, being a *Water-Fowle*, raketh pleasure in the *Aire*, that is *Condensed*: And besides, being but *Heavy* of *Wing*, needeth the *Help* of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossness* of the *Aire*, as the *Cold* and *Freshness* thereof, For being a *Bird* of *Prey*, and therefore *Hot*, she delighteth in the *Fresh Aire*. And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swim against the *Stream*. And yet it is true also, that all *Birds* find an *Ease* in the depth of the *Aire*; As *Swimmers* doe in a *Deep Water*. And therefore when they are aloft, they can uphold themselves with their *Wings Spread*; scarce moving them.

824

Fishes, when they play towards the *Top* of the *Watr*, doe commonly fore-tell *Raine*. The *Cause* is, for that a *Fish* hating the *Drie*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will flye it, and *Swim* lower.

825

Beasts doe take *Comfort*, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheep* will get up betimes in the

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the

the Morning, to feed, against Rain: And Cattel, and Deere, and Coneyes, will feed hard before Raine: And a Heifer, will put up his Nose, and snuffe in in the Aire, against Raine.

827 The Trifoile, against Raine, swelleth in the Stalk; and so standeth more upright; For by Wet, Stalkes doe erect, and Leaves bow downe. There is a Small Red Flower in the Stubble-Fields, which Countrey People call the *Wincopripe*; which if it open in the Morning, you may be sure of a fair Day to follow.

828 Even in Men, Aches, and Hurts, and Cornes, do engrave, either towards Raine, or towards Frost: For the One maketh the Humours more to Abound, and the Other maketh them Sharper. So we see both Extremes bring the Gout.

829 Wormes, Vermine, &c. doe fore-shew (likewise) Rain: For Earth-wormes will come forth, and Moules will cast up more, and Fleas bite more, against Raine.

830 Solid Bodies likewise fore-shew Raine. As Stones, and Wainscot, when they Sweat: And Boxes, and Peggs of Wood, when they Draw, and Wind hard; Though the Former be but from an Outward Cause; For that the Stone, or Wainscot, turneth and beateh back the Aire against it selfe; But the latter is an Inward Swelling of the Body of the Wood it selfe.

Experiment
Solitary tou-
ching the
Nature of Ap-
petite in the
Stomach.

831

Appetite is moved chiefly by Things that are Cold, and Dry; The Cause is, for that Cold is a Kinde of Indigence of Nature, and calleth upon Supply; And so is Drinesse: And therefore all Sour Things; (as Vinegar, Juice of Lemons, Oil of Vitriol, &c.) provoke Appetite. And the Disease which they call *Appetitus Caninus*, consisteth in the Matter of an Acide and Glassy Flegme, in the Mouth of the Stomach. Appetite is also moved by Soure Things; For that Soure Things induce a Contraction in the Nerves, placed in the Mouth of the Stomach, which is a great Cause of Appetite; As for the Cause why Onions, and Salt, and Pepper, in Baked Meats, move Appetite, it is by Vellication of those Nerves; For Motion whetteth. As for Worme-wood, Olives, Capers, and others of that kind, which participate of Bitternesse, they move Appetite by Absterision. So as there be four Principal Causes of Appetite, The Refrigeration of the Stomach joyned with some Drinesse, Contraction, Vellication; And Absterision: Besides Hunger, which is an Emptinesse: And yet Over-fasting, doth (many times) cause the Appetite to cease; For that want of Meat maketh the Stomach draw Humours; And such Humours as are Light, and Cholerick, which quench Appetite most.

Experiment
Solitary tou-
ching Sweet-
ness of Odour
from the
Rain-bow.

832

IT hath been observed by the Ancients, that where a Rain-Bow seemeth to hang over, or to touch, there breatheth forth a Sweet Smel. The Cause is, for that this happeneth but in certain Matters, which have in themselves some Sweetnesse; Which the Gentle Dew of the Rain-Bow, doth draw forth: And the like do Soft Showers; For they also make the Ground Sweet: But none are so delicate as the Dew of the Rain-Bow, where it falleth. It may be also, that the water it selfe hath some Sweetnesse: For the Raine-Bow consisteth of a Glomeration of Small Drops, which cannot possible fall, but from the Aire, that is very Low: And therefore may hold the very Sweetnesse of the Herbs, and Flowers, as a Distilled water: For Raine, and other Dew, that fall from high, cannot preserve the Smell, being dissipated in the drawing up: neither doe we know, whether some water it selfe may not have some degree of Sweetnesse. It is true, that we find it sensibly in no Pool, River,

nor

nor *Fountain*; but good *Earth*, newly turned up, hath a *freshness* and good *scent*; which *Water*, if it be not too equal, (for equal *objects* never move the *Sense*) may also have. Certaine it is, that *Bay-Salt*, which is but a kind of *Water* congealed, will sometimes smell like *Violets*.

TO Sweet Smells heat is requisite, to Concoct the *Matter*; and some *Moisture* to Spread the *Breath* of them. For heat, we see that *Woods*, and *Spices*, are more *Odorate* in the hot *Countries*, than in the cold: for *Moisture*, we see that things too much dried, lose their *Sweetness*: and *Flowers* growing, smell better in a Morning or Evening, than at Noon. Some Sweet Smells are destroyed by approach, to the *Fire*; as *Violets*, *Wall-flowers*, *Gilli-flowers*, *Pinks*; and generally all *Flowers* that have cool and delicate *Spirits*. Some continue both on the *fire*, & from the *fire*, as *Rose-Water*, &c. Some do scarce come forth or at least not so pleasantly, as by means of the *fire*, as *Juniper*, *Sweet-Gums*, &c. And all Smells, that are enclosed in a *Fast Body*: but (Generally) those Smells are the most grateful, where the *Degree* of heat is small; or where the strength of the *Smell* is allayed; for these things do rather wooe the *Sense*, then sariate it. And therefore the smell of *Violets*, and *Roses* exceedeth in *Sweetness* that of *Spices*, and *Gums* and the strongest sort of smells, are best in a west, a-farre off.

Experiment
Solitary, touch-
ing Sweet
Smells.

833

IT is certaine, that no *smell* issueth, but with *Emission* of some *Corporeal* Substance, Not as it is in *Light*, and *Colours*, and in *Sounds*, For we see plainly, that *Smell* doth spread nothing that distance, that the other doe. It is true, that some *Woods* of *Orenge*s, and *Heaths* of *Rose-mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, since a Peale of *Ordaunce* will doe as much, which moveth in a small *Compasse*? Whereas those *Woods* and *Heaths*, are of *Vast Spaces*: Besides, we see that *Smells* doe adhere to *Hard Bodies*; As in perfuming of *Gloves*, &c. which sheweth them *Corporeal*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment
Solitary, touch-
ing the
Corporeal Sub-
stance of Smells.

834

THE Excrements of most *Creatures* smell ill; Chiefly to the same *Creature* that voideth them: For we see, besides that of *Man*, that *Pigeons* and *Horses* thrive best, if their *Houses*, and *Stables* be kept Sweet; And so of *Cage-Birds*: And the *Cat* burieth that which she voideth: And it holdeth chiefly in those *Beasts*, which feed upon *Flesh*. *Dogs* (almost) onely of *Beasts* delight in *Fetide Odours*, Which sheweth there is somewhat in their *Sense* of *Smell*, differing from the smells of other *Beasts*. But the *Cause*, why *Excrements* smell ill, is manifest; For that the *Body* it selfe rejecteth them; Much more the *Spirits*: And we see, that those *Excrements* that are of the *First Digestion*, Smell the worst; As the *Excrements*, from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Urine*, and those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrefactions* are of an *Odious Smell*: For they smell either *Fertile* or *Mouldy*. The *Cause* may be, for that *Putrefaction* doth bring forth such a *Consistence*, as is most *Contrary* to the *Consistence* of the *Body*, whilest it is *Sound*: For it is a meer dissolution of that *Forme*. Besides, there is another Reason which is *Profound*: And it is, that the *objects* that please any of the *senses*, have (all) some *Equality*, and (as it were) *Order* in their *Composition*: But where those are wanting, the *Object* is ever *Ingrate*. So *Mixture* of many *Disagreeing colours*

Experiment
Solitary, touch-
ing Fetide
and Fragrant
Odours.

835

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is never unpleasent to the Eye : Mixture, of *Discordant sounds* is unpleasent to the Eare : Mixture, or *hotch-potch* of many tastes ; is unpleasent to the Taste: Harshnesse and Ruggednesse of Bodies, is unpleasent to the Touch : Now it is certaine that all *Putrefaction*, being a *Dissolution* of the first *Formes*, is a meer *Confusion*, and *Unformed* Mixture of the Part. Neverthelessse, it is strange, and seemeth to crosse the former Observation, that some *Putrefactions* and *Excrements* do yeeld excellent *Odours* ; as *Civet* and *Muske*; and as some think *Amber-Grease* : For divers take it, (though un-probably,) to come from the *Sperm* of *Fish* : and the *Mosse* we spake off from *Apple-Trees*, is little better then an *Excretion*. The Reason may be, for that there passeth in the *Excrements*, and remaineth in the *Putrefactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may be also joynd with a further Cause, which is more subtil; and it is, that the *Senses* love not to be Over-pleas'd; But to have a *Commixture* of somewhat that is in it selfe *Inerate*. Certainly, we see how *Discords* in *Musick*, falling upon *Concords*, make the *Sweetest Strains* : and we see againe, what strange tastes delight the *Taste*; as *Red-herrings*, *Caviary*, *Parmizan*, &c. And it may be, the same holdeth in *Smells*. For those kind of *Smells*; that we have mentioned, are all strong, and do Pull and Vellicate the *Sense*. And we find also, that places where Men *Urine*, commonly have some Smell of *Viols*. And *Urine*, if one hath eaten *Nutmeg*, hath lo too.

The Slothful, General, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Conjugations*; Of the *Influences* of *Heaven*; Of *Hot*, *Cold*, *Moisture* *Drought*, *Qualities* *Active*, *Passive*, and the like; have swallowed up the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Natural Bodies*. Therefore they are to be set aside, being but *Notional*, and *ill Limited*; and *Definite Axiomes* are to be drawn out of measured *Instances* : and so assent to be made to the more *General Axioms*, by *Scale*. And of these *Kinds* of *Processes* of *Nature*, and *Characters* of *Matter*, we will now set down some *Instancees*.

Experiment
Solitary touch-
ing the Cau-
ses of Putrefac-
tion.

836

ALL *Putrefactions* come chiefly from the inward *Spirits* of the *Body*, and partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoe-
ver else. And this last, by no *Means*: Either by *Ingress* of the *Substance*
of the *Ambient Body*, into the *Body Putrefied*; Or by *Excitation* and *Solicitation*
of the *Body Putrefied*, and the *Parts* thereof, by the *Body Ambient*. As for the
Received Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrine*,
and *Preternatural Heat*, it is but *Nugation*: For *Cold* in things *In-animate*,
is the greatest enemy that is to *Putrefaction*; though it extinguisheth *Vivi-*
fication, which ever consisteth in *Spirits Attenuate*, which the *Cold* doth con-
geale, and coagulare. And as for the *Peregrine heat*, it is thus farre true;
That if the *Proportion* of the *Adventine heat*, be greatly predominant, to the
Natural heat, and *Spirits* of the *Body*, it tendeth to *dissolution*, or notable
alteration. But this is wrought by *Emission*, or *Suppression*; or *Suffocation*, of
the *Native Spirits*, and also by the *Disordination*, and *Discomposure* of the
Tangible Parts; and other *Passages* of *Nature*; and not by a *Conflict* of heats.

In;

IN *Versions*, or *Main Alterations* of *Bodies*, there is a *Medium* between the *Body*, as it is at first, and the *Body* resulting; which *Medium* is *Corpus imperfectè Mistum*, and is *Transitory*, and not durable; As *Mists*, *Smoakes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vivification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*;) *Inquination*, or *Inconcoction*, which is a Kind of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

THE word *Concoction*, or *Digestion*, is chiefly taken into use from *Living Creatures*, and their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speak of *Meat Concocted*; *Urine* and *Excrements Concocted*; And the *Four Digestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Several Parts* of the *Body*;) are likewise called *Concoctions*: And they are all made to be the *Workes* of *Heat*: All which *Notions* are but ignorant *Catches* of a few things, which are most obvious to *Mens Observations*. The *Constantest Notion* of *Concoction* is, that it should signify the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to *Perfect Concoction*; which is the *Ultimity* of that *Action*, or *Process*: And while the *Body* to be *Converted* and *Altered*, is too strong for the *Efficient*, that should *Convert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first *Forme*, or *Consistence*;) it is (all that while) *Crude*, and *Inconcoct*; And the *Process* is to be called *Crudity* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Work* of *Heat*: But not the *Work* of *Heat* alone: For all things, that further the *Conversion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Means* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conversion* and *Subaction*; The other *Maturation*: whereof the *Former* is most conspicuous in the *Bodies* of *Living Creatures*; In which there is an *Absolute Conversion* and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And again in *Metals*, where there is a full *Transmutation*. The other, (which is *Maturation*) is seen in *Liquours* and *Fruits*; wherein there is not desired, nor pretended, an utter *Conversion*, but only an *Alteration* to that *Form*, which is most sought, for *Mans* use; As in *Clarifying* of *Drinks*, *Ripening* of *Fruits*, &c. But note, that there be two *Kinds* of *Absolute Conversions*; The one is, when a *Body* is converted into another *Body* which was before; As when *Nourishment* is turned into *Flesh*; That is it which we call *Assimilation*. The other is, when the *Conversion* is into a *Body* merely *New*, and which was not before; As if *Silver* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conversion* is better called, for distinction sake, *Transmutation*.

THEre are also divers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoever doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Major*: As when *Meat* is *Boyled*, or *Rosted*, or *Fried*, &c. Or when *Bread* and *Meat* are *Baked*, Or when *Cheese* is made of *Curds*, or *Butter* of *Cream*, or *Coles* of *Wood*, or *Bricks* of *Earth*; And a Number of others. But to apply *Notions* *Phylosophical* to *Plebian Terms*; Or to say, where the *Notions* cannot fitly be reconciled that there wanteth a *Term*, or *Nomenclature* for it; (as the *Ancients* used:) They be but *Shifts* of *Ignorance*: For

Knowledge

Experiment
Solitary touch-
ing Bodies
imperfectly
Mist.

837

Experiment
Solitary touch-
ing Conco-
ction and
Crudity.

838

Experiment
Solitary touch-
ing Altera-
tions, which
may be called
Majors.

839

Knowledge will be ever a *Wandering* and *Indigested Thing*, if it be but a *Com-mixture* of a few *Notions*, that are at hand and occurre and not excited from sufficient Number of instances, and those well collated.

The *Consistencies* of *Bodies* are very *Divers*: *Dense*, *Rare*, *Tangible*, *Pneumatical*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*, *Hard*, *Soft*; *Cleaving*, *Not Cleaving*; *Congelable*, *Not Congelable*; *Liquefiable*; *Not Liquefiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawn forth in length, *Intractile*; *Porous*, *Solide*; *Equal*, and *Smooth*, *Vnequal*; *Venous*, and *Fibrous*, and with *Grains*, *Entire*; And divers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought* is a *Compendious* and *In-utile Speculation*. But of these see principally our *Abecedarium Naturæ*, And otherwise *Sparsum* in this our *Sylvæ Sylvarum*: Nevertheless, in some good part, We shall handle divers of them now presently.

Experiment
Solitary tou-
ching *Bodies*
Liquefiable,
and not *Lique-*
fiable.

840

Liquefiable, and *Not Liquefiable*, proceed from these *Causes*: *Liquefaction* is ever caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies* as are more *Turgide* of *Spirit*, Or that have their *Spirits* more *Straitly imprisoned*; Or again that hold them *Better Pleas'd* and *Content*; Are *Liquefiable*: for these three *Dispositions* of *Bodies* doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metals*; And of the last in *Grease*, *Pitch*, *Sulphur*, *Butter*, *Wax*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies* *sejune* of *Spirits*; Or which part with their *Spirits* more *Willingly*, are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, even many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the *Forge*, And a *Stick* bathed in *Hot Ashes*, which thereby becommeth more *Flexible*. Moreover, there are some *Bodies*, which do *Liquefie*, or dissolve by *Fire*, As *Metals*, *Wax*, &c. And other *Bodies*, which dissolve in *Water*, As *Salt*, *Sugar*, &c. The *Cause* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The *Cause* of the latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receive the *Liquour*. Again, there are some *Bodies* that dissolve with both; As *Gumme*, &c. And those be such *Bodies*, as on the one side have good store of *Spirit*; And on the other side, have the *Tangible Parts* *Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the latter stimulateth the *Parts* to recive the *Liquour*.

Experiment
Solitary, tou-
ching *Bodies*
Fragile and
Tough.

841

OF *Bodies* some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* break but where the *Force* is: Some shatter and flie in many *Pieces*. Of *Fragility* the *Cause* is an *Impotency* to be *Extended*: And therefore *Stone* is more *Fragile* then *Metal*; And so *Fibile Earth* is more *Fragile* than *Crude Earth*, and *Dry Wood* than *Green*. And the *Cause* of this *Un-aptness* to *Extension*, is the *Small Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is ever *Concomitant* with *Porosity*, and with *Driness* in the *Tangible Parts*;
Contrariwise

Contrariwise, Tough Bodies have more Spirits, and fewer Pores, and *Moister Tangible Parts*: Therefore we see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Wollen Cloth* will tenter, *Linnen* scarcely.

ALL *Solid Bodies* consist of *Parts* of two severall *Natures*; *Pneumatical*, and *Tangible*; And it is well to be noted, that the *Pneumatical Substance* is in some *Bodies*, the *Native Spirit* of the *Body*; And in some other, plain *Air* that is gotten in, As in *Bodies desiccate*, by *Heat*, or *Age*: For in them when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Air* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fragile*; For the *Native Spirit* is more *Yielding*, and *Extensive*, (especially to follow the *Parts*), than *Air*. The *Native Spirits* also admit great *Diversity*; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as we call them) of *Bodies*: But the *Air Intermixt*, is without *Vertues*, and maketh Things *Inspide*, and without any *Extimulation*.

Experiment Solitary touching the Two kinds of Pneumatics in Bodies.

841

THE *Concretion* of *Bodies* is (commonly) solved by the *Contrary*, As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolved by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations* are rather *Returns* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oile*, it doth neither easily congeal with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by *Contrary Efficients*, seemeth to be the *Same*; And that is, because the *Spirit* of the *Oile*, by either *Means*, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it be *Vehement*) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them *Swell*, than *Congee* them: As when *Ice* is congealed in a *Cup*, the *Ice* will *Swell* in stead of *Contracting*; And sometimes *Rift*.

Experiment Solitary touching Concretion, and Dissolution of Bodies.

843

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardness* is caused (chiefly) by the *Jejuneness* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which if they be in a greater degree, maketh them not onely *Hard*, but *Fragile*, and lesse *Enduring* of *Pressure*; As *Steel*, *Stone*, *Glass*, *Dry Wood*, &c. *Softness* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which ever helpeth to Induce *Yielding* and *Cession*;) And by the more *Equal Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies* (as we use the word,) are of two *Kinds*; The one, that easily giveth place to another *Body*, but altereth not *Bulke*, by *Rising* in other *Places*: And therefore we see that *Wax*, if you put any *Thing* into it, doth not rise in *Bulk*, but only giveth *Place*: For you may not think, that in *Printing* of *Wax*, the *Wax* riseth up at all; But only the *depressed Part* giveth *place*, and the other remaineth as it was. The other that altereth *Bulk* in the *Cession*, as *Water*, or other *Liquours*, if you put a *Stone* or any *Thing* into them, they give *place* (indeed) easily, but then they rise all over: Which is a *Falſe Cession*; For it is in *Place*, and not in *Body*.

Experiment Solitary touching Hard and Soft Bodies.

844

ALL *Bodies Ductile*, and *Tensile*, (as *Metals*) that will be drawne into *Wires*; *wooll* and *Towe* that will be drawn into *Yarn*, or *Thred*; have in them the *Appetite* of *Not Discontinuing*, *Strong*; Which maketh them follow the *Force*, that pulleth them out; And yet so, as not *Discontinue* of

Experiment Solitary touching Bodies Ductile, and Tensile.

845

forfake their own *Body*. *Viscous Bodies*, (likewise,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese toasted*; will draw forth, and roape. But the difference between *Bodies Fibrous*, and *Bodies Viscous*, is *Plaine*; For all *Wool*, and *Towe*, and *Cotton*, and *Silke*, (especially raw *Silke*;) have, besides their desire of *Continuance*, in regard of the *Territie* of their *Thred*, a *Greediness* of *Moisture*; And by *Moisture* to joyne and incorporate with other *Thred*; Especially, if there be a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the Practice of *Twirling* about of *Spindles*. And we see also, that *Gold* and *Silver Thred* cannot be made without *Twisting*.

Experiments
Solitary touch-
ing other
Passions, or
Matter and
Characters, of
Bodies.

846

THE Differences of *Impressible*, and *Not Impressible*, *Figurable*, and *Not Figurable*; *mouldable*, and *Not Mouldable*; *Scissible*, and *Not Scissible*; and many other *Fassions of Matter*, are *Plebeian Notions*, applied unto the *Instruments* and *Uses* which Men ordinarily practice; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would be too long. The First is the *Cession*, or *Not Cession of Bodies*, into a *Smaller Space* or *Roome*, keeping the *Outward Bulke*, and not flying up. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continue*, and to flie *Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantity*, or *Great Quantity*, of the *Pneumatical* in *Bodies*. The Fifth is the *Nature* of the *Pneumatical*, whether it be *Native Spirits* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Native Spirits* in the *Body*, whether they be *Active*, and *Eager*, or *Dull* and *Gentle*. The Seventh is the *Emission* or *Detension* of the *Spirits* in *Bodies*. The Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equal*, or *Unequal*: And again, whether the *Spirits* be *Concervate*, or *Diffused*. The Tenth is the *Densitie*, or *Rarity* of the *Tangible Part*. The Eleventh is the *Equality*, or *In-equality* of the *Tangible Parts*. The Twelfth is the *Digestion*, or *Crudity* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous*, or *Mercurial*, *Watry*, or *Oillie*, *Drie*, and *Terrestrial*, or *Moist*, and *Liquid*; which *Natures* of *Sulphureous* and *Mercurial*, seem to be *Natures Radical*, and *Principal*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length* or *Transverse*; (As it is in the *Warp*, and the *Woofe* of *Textiles*;) *More Inward* or *More Outward*, &c. The Fifteenth is the *Porosity*, or *Imporosity* betwixt the *Tangible Parts*; And the *Greatness*, or *Smallness* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; But these doe occurre for the Present.

Experiment
Solitary, touch-
ing Indura-
tion by Sympa-
thy.

847

TAKE *Lead*, and melt it, and in the *Middst* of it, when it beginneth to *Congea*le, make a little *Dint*, or *Hole*; and put *Quick-Silver* wrapped in a *Piece of Linnen* into that *Hole*, and the *Quick-Silver* will fix, and runne no more, and endure the *Hammer*. This is a *Noble Instance* of *Induration*, by *Consent* of one *Body* with another, and *Motion* of *Excitation* to *Imitate*; For to ascribe it onely to the *Vapour* of *Lead*, is lesse *Probable*; *Quere* whether the *Fixing* may be in such a *degree*, as it will be *Figured* like other *Metals*? For if so, you may make *Works* of it for some purposes, for they come not neer the *Fire*.

Sugar hath put downe the use of *Honey*; Infomuch as wee have lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Tear* or *Bloud* issuing from the *Tree*: Infomuch as one of the *Ancients* relateth, that in *Tribesond*, there was *Honey* issuing from the *Box-Trees*, which made *Men Mad*. Again, in Ancient time, there was a Kind of *Honey*, which either of the own Nature, or by *Art*, would grow as Hard as *Sugar*; And was not so Lushious as Ours. They had also a *Wine* of *Honey*, which they made thus. They crushed the *Honey* into a great *Quantity* of *Water*, and then stained the *Liquour*; After they boiled it in a *Copper* to the half; Then they poured it into *Earthen Vessels*, for a small time; And after turned it into *Vessels* of *Wood*, and kept it for many years. They have also, at this day, in *Russia*, and those *Northerne Countreys*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drink*, and very Clear. They use also in *Wales*, a *Compound Drink* of *Mead*, with *Herbs*, and *Spices*. But mean-while it were good, in recompence of that we have lost in *Hony*, there were brought in use a *Sugar-Mead*, (for so we call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keep it stale, as they use *Mead*; For certainly, though it would not be so *Absterfive*, and *Opening*, and *Solutive* a *Drink* as *Mead*; yet it will be more grateful to the *Stomach*, and more *Lenitive*, and fit to be used in *Sharp Diseases*: For we see, that the use of *sugar* in *Beer*, and *Ale*, hath good *Effects* in such *Cases*.

Experiment
Solitary touching
Honey
and *Sugar*.
848

IT is reported by the *Ancients*, that there was a Kind of *Steel*, in some places, which would polish almost as white and bright as *Silver*. And that there was in *India* a Kinde of *Brass*, which (being polished) could scarce be discerned from *Gold*. This was in the *Natural Ure*; but I am doubtful, whether *Men* have sufficiently refined *Metals*, which we count *Base*; As whether *Iron*, *Brass*, or *Tinne*, be refined to the Height? But when they come to such a Fineness, as serveth the ordinary use, they try no further.

Experiment
Solitary touching
the
Finer Sort of
Base Metals.
849

THere have been found certain *Cements* under *Earth*, that are very Soft; And yet, taken forth into the *Sun*, harden as Hard as *Marble*: There are also ordinary *Quarries* in *Somersetshire*, which in the *Quarry* cut soft to any bigness, and in the *Building* prove firm, and hard.

Experiment
Solitary touching
Cements
and *Quarries*.
850

Living *Creatures* (generally) do change their *Hair* with *Age*, turning to be *Gray* and *White*: As is seen in *Men*, though some Earlier, some Later; In *Horses*, that are Dapled, and turn *White*; in *Old Squirrels*, that turn *Grizzly*; And many Others. So doe some *Birds*; As *Cygnets*, from *Gray* turn *White*; *Hawks* from *Brown* turn more *White*; And some *Birds* there be, that upon their *Moulting*, do turn *Colour*; As *Robin-Red-breasts*, after their *Moulting* grow to be *Red* again by degrees; So do *Gold-Finches* upon the *Head*. The *Cause* is, for that *Moisture* doth (chiefly) colour *Hair*, and *Feathers*; And *Drienes* turneth them *Gray* and *White*; Now *Hair* in *Age* waxeth *Drier*: So do *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Hair* of the *Head*, and doth (for the most part,) wax *Hoar* later. Out of this *Ground*, a *Man* may devise the *Means* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoar-Hairs*. But of this see the fifth *Experiment*.

Experiment
Solitary touching
the
Altering of the
Colour of
Hairs and *Feathers*.
851

Experiment
Solitary tou-
ching the Dif-
ferences of Li-
ving Creatures,
Male and Fe-
male.

852

THe Difference between *Male* and *Female*, in some *Creatures*, is not to be discerned, otherwise than in the *Parts of Generation*: As in *Horses* and *Mares*, *Dogs*, and *Bitches*, *Doves* *He* and *Shee*, and others. But some differ in *Magnitude*, and that diversly; For in most the *Male* is the greater; As in *Man*, *Pheasants*, *Peacocks*, *Turkey's*; and the like: And in some few, as in *Hawkes* the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantity*, *Crispation*, and *Colours* of them; As *He-Lions*, are *Hirsute*, and have great *Mains*; The *She's* are smooth like *Cats*. *Buls* are more *Crispe* upon the *Fore-Head* than *Cowes*; The *Peacock*, and *Pheasant-Cock*, and *Gold-Finch-Cock*, have glorious and fine *Colours*; The *Hens* have not. Generally, the *Hees* in *Birds* have the *Fairest Feathers*. Some differ in divers *Features*; As *Bucks* have *Horns*, *Doe's* none; *Rams* have more *Wreathed Horns* than *Ewes*; *Cocks* have great *Combes* and *Spurs*, *Hens* little or none; *Boars* have great *Fangs*, *Sowes* much less; The *Turkey-Cock* hath great and *Swelling Gills*, the *Hen* hath less; *Men* have generally *Deeper* and *Stronger Voices* than *Women*. Some differ in *Faculty*; As the *Cocks* amongst *Singing Birds*, are the best *Singers*. The *Chief Cause* of all these, (no doubt,) is, for that the *Males* have more *Strength of Heat* than the *Females*; Which appeareth manifestly in this, that all young *Creatures Males*, are liker *Females*; And so are *Eunuches*, and *Gelt Creatures* of all kindes, liker *Females*. Now *Heat* causeth *Greatness* of *Growth*, generally, where there is *Moisture* enough to work upon: But if there be found in any *Creature* (which is seen rarely,) an *Over-great Heat* in proportion to the *Moisture*, in them the *Female* is the greater; As in *Hawks*, and *Sparrows*. And if the *Heat* be ballanced with the *Moisture*, then there is no *Difference* to be seen between *Male* and *Female*: As in the *Instances* of *Horses*, and *Dogs*. We see also, that the *Horns of Oxen*, and *Cowes*, for the most part, are *Larger* than the *Buls*, which is caused by abundance of *Moisture*, which in the *Horns* of the *Bull* faileth. Again, *Heat* causeth *Pilosity* and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which want of *Heat* cannot Expel; And that is the *Cause* of the *Beauty* and *Variety* of *Feathers*: Again, *Heat* doth put forth many *Excrescences*, and much *Solide Matter*, which *Want* of *Heat* cannot doe: And this is the *Cause* of *Horns*, and of the *Greatness* of them; And of the *Greatness* of the *Combes* and *Spurs* of *Cocks*, *Gills* of *Turkey-Cocks*, and *Fangs* of *Boars*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepness* of the *Voice*. Again, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excel the *Hen*.

Experiment
Solitary tou-
ching the
Comparative
Magnitude of
Living Crea-
tures.

853

THere be *Fishes* greater then any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*. For *Fishes*, the *Cause* may be, that because they *Live* not in the *Aire*, they have not their *Moisture* drawn, and *Soaked* by the *Aire*, and *Sun-beames*. Also the rest always in a manner, and are supported by the *Water*; whereas *Motion* and *Labour* do consume. As for the *Greatness* of *Beasts*, more than of *Birds*; it is caused, for that *Beasts* stay *Longer* time in the *Womb*, than *Birds*, and there *Nourish*, and grow; Whereas in *Birds*, after the *Egg* lay'd; there is no further *Growth*, or *Nourishment* from the *Female*: For the *Sitting* doth *Visifie*, and not *Nourish*.

Experiment
Solitary tou-
ching Exoffa-
tion of Fruits.

854

WE have partly touched before the *Means* of *Producing Fruits*, without *Coares*, or *Stones*. And this wee add further; that the *Cause* must bee *Abundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Dry*

Sap:

Sap: And we see, that it is possible, to make a Tree put forth onely in Blossome, without Fruit; As in Cherries with Double Flowers; Much more in Fruit without Stones, or Coares. It is reported, that a Cions of an Apple, grafted upon a Colewort-stalk, sendeth forth a great Apple without a Core. It is not unlikely, that if the Inward Pith of a Tree, were taken out, so that the Juice came onely by the Bark, it would work the Effect. For it hath been observed, that in Pollards if the Water get in on the Top, and they become Hollow, they put forth the more. We add also, that it is delivered for certain by some, that if the Cions be grafted, the Small End down-wards, it will make Fruit have little or no Coares, and Stones.

Tobacco is a thing of great Price, if it be in request. For an Acre of it will be worth, (as is affirmed,) two Hundred Pounds, by the year, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the English Tobacco, hath small credit, as being too Dull, and Earthy: Nay, the Virginian Tobacco, though that be in a Hotter Climate, can get no credit, for the same Cause: So that a Trial to make Tobacco more Aromatical, and better Con-cocted here in England, were a thing of great profit. Some have gone about to doe it by Drenching the English Tobacco, in a Decoction, or Infusion of Indian Tobacco: But those are but Sophistications, and Toyes; For Nothing that is once Perfect, and hath runne his Race, can receive much Amendment. You must ever resort to the Beginnings of Things for Melioration. The Way of Maturation of Tobacco must, as in other Plants, be, from the Heat, Either of the Earth, or of the Sunne: We see some Leading of this in Musk-Melons; which are sowed upon a Hot Bed, Dunged below, upon a Bank turned upon the South Sun, to give Heat by Reflection; Laid upon Tiles, which increaseth the Heat; And Covered with Straw to keep them from Cold. They remove them also, which addeth some Life: And by these Helps they become as good in England, as in Italy, or Provence. These, and the like Meanes, may be tried in Tobacco. Enquire also of the Steeping of Roots, in some such Liqueour, as may give them Vigour to put forth Strong.

Experiment Solitary touching the Melioration of Tobacco.

855

Heat of the Sunne, for the Maturation of Fruits; Yea, and the Heat of Vivification of Living Creatures; are both represented and supplied, by the Heat of Fire, And likewise, the Heats of the Sunne, and Life, are represented one by the other. Trees, set upon the Backs of Chymnies, doe ripen Fruit sooner. Vines, that have been drawn in at the Window of a Kitchen, have sent forth Grapes ripe a Moneth (at least) before others. Stores, at the Backe of Walls, bring forth Oreniges here with us. Egges, as is reported by some, have been hatched in the warmth of an Oven. It is reported by the Ancients, that the Estrich Layeth her Egges under Sand, where the Heat of the Sunne discloseth them.

Experiment Solitary touching several Heate, working the same Effects.

856

Barley in the Boiling swelleth not much; Wheat swelleth more; Rice extreamly; In so much as a Quarter of a Pint (unboyled) will arise to a Pint boyled. The Cause (no doubt) is, for that the more Close and Compact the Body is, the more it will dilate: Now Barley is the most Hollow; Wheat more Solide than that; and Rice most Solide of all. It may be also, that some Bodies have a Kinde of Lentour, and more Depertible Nature than others; As we see it Evident in Colouration; For a small Quantity of Saffron, will Tinct more, then a very great Quantity, of Brasil, or Wine.

Experiment Solitary touching Swelling and Dilatation in Boiling.

857

Experiment
Solitary touch-
ing the Dul-
civation of
Fruits.

858

Fruit groweth Sweet by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling Pears, Damascins, &c.* By *Rottenesse*; As *Medlars, Services, Slows, Heps, &c.* By *Time*; As *Apples, Wardens, Pomegranates, &c.* By certain *Special Maturations*; As by *Laying* them in *Hay, Straw, &c.* And by *Fire*; As in *Roasting, Stening, Baking, &c.* The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emollition*, which they properly endure; As in *Beating of Stock-fish, Fleish, &c.* By *Rottenesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*; and thereby digest the *Harder Part*: For in all *Putrefactions*, there is a *Degree of Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe ever feed upon the *Tangible Parts*, and attenuate them. By *Several Maturations* is, by some *Degree of Heat*. And by *Fire* is, because it is the *Proper Worke* of *Heat* to *Refine*, and to *Incorporate*; And all *Sourenesse* consisteth in some *Grossenesse* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equal*, in all the *Parts*; Which ever induceth a *Milder Taste*.

Experiment
Solitary touch-
ing *Fleish*
Edible, and
not *Edible*.

859

Of *Fleishes*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they have (commonly) too much *Bitternesse* of *Taste*, And therefore those *Creatures*, which are *Fierce* and *Cholerick*, are not *Edible*; As *Lions, Wolves, Squirrels, Dogs, Foxes, Horses, &c.* As for *Kine, Sheep, Goats, Deer, Swine, Conneys, Hares, &c.* We see they are *Milde*, and *Fearfull*. Yet it is true, that *Horses*, which are *Beasts* of *Courage*, have been, and are eaten by some *Nations*; As the *Scythians* were called *Hippopagi*; And the *Chineses* eat *Horse-fleish* at this day; And some *Gluttons* have used to have *Colts-fleish* baked. In *Birds*, such as are *Carnivora*, and *Birds* of *Prey*, are commonly no *Good Meat*; But the Reason is, rather the *Cholerick Nature* of those *Birds*, than their *Feeding* upon *Fleish*; For *Puits, Guls, Shovelers, Ducks*, doe feed upon *Fleish*, and yet are good *Meat*: And we see, that those *Birds*, which are of *Prey*, or feed upon *Fleish*, are good *Meat*, when they are very *Young*; As *Hawkes, Rookes* out of the *Nest*, *Owles, &c.* *Mans Fleish* is not *Eaten*. The Reasons are *Three*: First, because *Men* in *Humarity* doe abhorre it: Secondly, because no *Living Creature*, that *Dieth* of it selfe, is good to *Eat*: And therefore the *Cannibals* (themselves) eat no *Mans Fleish*, of those that *Die* of *Themselves*, but of such as are *Slain*. The Third is, because there must be (generally) some *Disparity*, between the *Nourishment*, and the *Body Nourished*; And they must not be *Over-near*, or like: yet wee see, that in great *Weaknesses*, and *Consumptions*, *Men* have been sustained with *Womans Milk*: And *Picinnus* fondly, (as I conceive) advieth for the *Prolongation* of *Life*, that a *Vein* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* do greedily eat *Mans Fleish*; which if It be true, besides a *Devillish Appetite* in them, it is likely to proceed, for that *Mans Fleish* may send up *High* and *Pleasing Vapours*, which may stirre the *Imagination*; And *Witches* Felicity is chiefly in *Imagination*, as hath been said.

Experiment
Solitary touch-
ing the *Salamander*.

860

There is an *Ancient Received Tradition* of the *Salamander*, that it liveth in the *Fire*, and hath force also to extinguish the *Fire*. It must have two Things; if it be true, to this *Operation*, The One, a very *Close Skin*, whereby *Flame*, which in the *Midst* is not so hot, cannot enter: For we see that if the *Palme* of the *Hand* be anointed thick with *White of Eggs*, and then

then *Aqua-vitæ*, be poured upon it, and *Enflamed*, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold*, and *Quenching Vertue*, in the *Body* of that *Creature* which choaketh the *Fire*. We see that *Milke* quencheth *Wild-fire* better than *Water*, because it entreth better.

Time doth change *Fruit*, (as *Apples*, *Pears*, *Pomegranates*, &c. from more *Soure* to more *Sweet*: But contrariwise, *Liquors* (even those that are of the *Juice* of *Eruit*;) from more *Sweet* to more *Soure*, As *Wort*, *Must*, *New-Verjuice*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both *Kinds*, the *Spirit* is attenuated by *Time*; But in the first *Kinde*; it is more *Diffused*, and more mastered by the *Grosser Paris*; which the *Spirits* doe but digest: But in *Drinks* the *Spirits* doe reign, and finding lesse *Opposition* of the *Parts*; become themselves more *Strong*; Which causeth also more *Strength* in the *Liquor*; Such, as if the *Spirits* be of the *Hotter Sort*; the *Liquor* becommeth apt to *Burn*; But in *Time*, it causeth likewise, when the *Higher Spirits* are *Evaporated*, more *Sourness*.

IT hath been observed by the *Ancients*, that *Plates* of *Metal*, and especially of *Brasse*, applied presently to a *Blow*, will keep it down from *Swelling*. The *Cause* is *Repercussion*, without *Humestation*, or *Entrance* of any *Body*: for the *Plate* hath only a *Virtual Cold*, which doth not search into the *Hurt*; Whereas all *Plaisters* and *Ointments* doe enter. Surely, the *Cause* that *Blows* and *Bruises* induce *Swellings* is, for that the *Spirits* resorting to *Succour* the *Part* that *Laboureth*, draw also the *Humors* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

The *Nature* of the *Orris Root*; is almost *Singular*; For there be few *Odoriferous Roots*; And in those that are in any degree, *Sweet*, it is but the same *Sweetness*, with the *Wood* or *Leafe*: but the *Orris* is not *Sweet* in the *Leaf*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a *Tender dainty Heat*, which when it commeth above *Ground*, to the *Sun*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a *Smell* like a *Violet*.

IT hath been observed by the *Antients*, that a great *Vessel* full, drawn into *Bottles*; And then the *Liquor* put again into the *Vessel*, will not fill the *Vessel*, again, so full as it was, but that it may take in more *Liquor*; And that this holdeth more in *Wine*, than in *Water*. The *Cause* may be *Trivial*; Namely, by the *Expence* of the *Liquor*, in regard some may stick to the *Sides* of the *Bottles*: But there may be a *Cause* more *Subtill*; Which is, that the *Liquor* in the *Vessel*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessel*, the *Liquor* meeteth with *Liquor* chiefly; But in the *Bottles* a *Small Quantity* of *Liquor* meeteth with the *Sides* of the *Bottles*, which *Compress* it so, that it doth not *Open* again.

Water, being contiguous with *Aire*, *Cooleth* it, but *Moisteneth* it not, except it *Vapour*, The *Cause* is, for that *Heat* and *Cold* have a *Virtual Transfusion*; without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*, But where the *Bodies* are of such several *Levitie*, and *Gravity*, as they *Mingle* not, they can follow

Experiment Solitary touching the Contrary Operations of Time, upon Fruits and Liquours. 861

Experiment Solitary touching Blows and Bruises. 862

Experiment Solitary touching the Orris Root. 863

Experiment Solitary touching the Compression of Liquours. 864

Experiment Solitary touching the working of water upon Aire contiguous. 865

no *Imbibition*. And therefore, *Oile* likewise lyeth at the *Top* of the *Water*, without *Com-mixture*: And a *Drop* of *Water*, running swiftly over a *Straw*, or *Smooth Body*, wetteth not.

Experiment
Solitary tou-
ching the Na-
ture of Aire.

866

Starve-Light Nights, yea, and bright *Moon-shine Nights*, are *Colder* than *Cloudy Nights*. The *Cause* is, the *Dryness* and *Fineness* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharp*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moon*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is drie. Also *Close Aire*, is warmer than *Open Aire*; which (it may be) is, for that the true *Cause* of *Cold*, is an *Expiration* from the *Globe* of the *Earth* which in open *Places* is stronger; And again, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some *Secret Degree* of *Heat*: As it is not likewise without some *Secret Degree* of *Light*: For otherwise *Cats*, and *Omles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visual Spirits* of those *Creatures*.

Experiment in
Consort, tou-
ching the Eyes,
and Sight.

867

THE *Eyes* doe move one and the same way; For when one *Eye* moveth to the *Nostril*, the other moveth from the *Nostril*. The *Cause* is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spiritual*, is *Strong*. But yet *Use* will induce the *Contrary*: For some can *Squint*, when they will: And the *Common Tradition* is, that if *Children*, be set upon a *Table*, with a *Candle* behinde them, both *Eyes* will move *Outwards*; As affecting to see the *Light*, and so induce *Squinting*.

868

We see more exquisitely with *One Eye Shut*, than with *Both open*. The *Cause* is, for that the *Spirits Visual* unite themselves more, and so become *Stronger*. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupil* of the other *Eye*, that is *Open*, Dilateth.

869

The *Eyes*, if the *Sight* meet not in one *Angle*, See things *Double*. The *Cause* is, for that *Seeing two Things*, and *Seeing one Thing twice*, worketh the same *Effect*: And therefore a little *Pelet*, held between two *Fingers*, laid crosse, seemeth *Double*.

870

Pore-Blind Men, see best in the *Dimmer Light*; And likewise have their *Sight* *Stronger* neer hand, than those that are not *Pore-Blind*; And can *Read* and *Write* smaller *Letters*. The *Cause* is, for that the *Spirits Visual*, in those that are *Pore-Blind*, are *Thinner*, and *Rarer*, than in others; And therefore the *Greater Light* disperfeth them. For the same *Cause* they need *Contracting*; But being *Contracted*, are more strong, than the *Visual Spirits* of *Ordinary Eyes* are; As when we see thorow a *Level*, the *Sight* is the *Stronger*: And so is it, when you gather the *Eye-lids* som-what close: And it is commonly seen in those that are *Pore-Blind*, that they do much gather the *Eye-lids* together. But *Old Men*, when they would see to *Read*, put the *Paper* somewhat afar off. The *Cause* is, for that *Old Mens Spirits Visual*, contrary to those of *Pore-blind Men*, unite not, but when the *Object* is at some good distance, from their *Eyes*.

871

Men see better, when their *Eyes* are over-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The *Reason* is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For we see, that an *Over-light* maketh the *Eyes* *Dazell*; Infomuch as *Perpetual Looking* against the *Sunne*, would *Cause Blindnesse*. Again, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a *Light*

Light Roome, they seem to have a *Mist* before their eyes, and see worse than they shall doe, after they have stayed a little while; either in the *Light*, or in the *Dark*. The *Cause* is, for that the *Spirits Visual*, are upon a sudden Change, disturbed, and put out of Order; And till they be recollected, do not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* suddenly; And when they are much *Contracted* by *Darknesse*, they cannot *Dilate* suddenly. And Excesse of both these, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visual*) if it be long, Destroyeth the *Eye*. For as long looking against the *Sunne*, or *Fire* hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading of Small Letters*, doe hurt the *Eye* by *Contraction*.

It hath been observed, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behind them. The *Cause* is, for that in *Anger*, the *Spirits* ascend and wax *Eager*, Which is most easily seen in the *Eyes*, because they are *Translucide*; Though withall it maketh both the *Cheekes* and the *Gills* *Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to *Succour*, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in *Shame* doe put back the *Spirits*, that ascend to them, as unwillingly to look abroad: For no *Man*, in that *Passion*, doth look strongly, but *Dejectedly*; And that *Repulsion* from the *Eyes*, Diverteth the *Spirits* and *Heat* more to the *Eares*, and the parts by them.

The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath been said. The *Glimpses* and *Beames* of *Diamonds* that strike the *Eye*, *Indian Feathers*, that have glorious *Colours*; The *Coming* into a *Faire Garden*; The *Coming* into a *Faire Roome* richly furnished; A *Beautiful Person*; And the like; doe delight and exhilarate the *Spirits* much. The *Reason*, why it holdeth not in the *Offence*, is, for that the *Sight* is most *Spiritual* of the *Senses*; whereby it hath no *Object* *Grosse* enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active Objects* to offend the *Eye*. For *Harmonical Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smells* and *Stinks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore have little or no *Activity*. Somewhat they doe *Constristate*, but very little.

Water of the *Sea*, or otherwise, looketh *Blacker* when it is moved, and *Whiter* when it resteth. The *Cause* is, for that by means of the *Motion*, the *Beames* of light pass not *Straight*, & therefore must be darkened; whereas, when it resteth, the *Beames* do pass *Straight*. Besides, *Splendour* hath a *Degree* of *Whiteness*; Especially if there be a little *Repercussion*: For a *Looking-Glass* with the *Steel* behinde, looketh *Whiter* than *Glass Simple*. This *Experiment* deserveth to be driven further, in *Trying* by what Means *Motion* may hinder *Sight*.

Shell-Fish have been by some of the *Ancients*, compared and sorted with the *Insecta*, But I see no reason why they should; For they have *Males*, and *Females*, as other *Fish* have: Neither are they bred of *Putrefaction*; Especially such as do *Move*. Nevertheless, it is certain, that *Oysters*, and *Cockles*, and *Mussels*, which move not, have not discriminate *Sex*. *Quere* in what time, & how they are bred; It seemeth that *Shells* of *Oysters* are bred where

none

872

873

Experiment
Solitary touching the Colour of the Sea, or other water.

874

Experiment
Solitary touching Shell-Fish.

875

none were before, And it is tried, that the great *Horse-Muscle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirty years: But then, which is strange, it hath been tried, that they do not onely Gape and Shut, as the *Oysters* do, but Remove from one Place to Another.

Experiment
Solitary touch-
ing the *Right*
Side and the
Left.

876

THe *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limbes* on the *Right Side* are Stronger. The *Cause* may be, for that the *Brain* which is the *Instrument of Sense*, is alike on both *Sides*; But *Motion*, and *Habilities of Moving*, are somewhat holpen from the *Liver*, which lieth on the *Right-Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides* from the Time of our Birth; But the *Limbes* are used most on the *Right Side*, whereby *Custom* helpeth; For we see, that some are *Left-banded*: Which are such as have used the *Left-Hand* most.

Experiment
Solitary touch-
ing *Frictions*
ons.

877

Frictions make the *Parts* more *Fleshie*, and *Full*: As we see both in *Men*: And in the *Currying of Horses*, &c. The *Cause* is, for that they draw greater *Quantity of Spirits* and *Bloud* to the *Parts*: And again, because they draw the *Aliment* more forcibly from within: And again, because they relax the *Pores*, and so make better *Passages* for the *Spirits*, *Bloud*, and *Aliments*: Lastly, because they dissipate, and digest any *Inutile* or *Excrementitious Moisture*, which lieth in the *Flesh*: All which help *Assimilation*. *Frictions* also do more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleshie*, because they stirre the *Limbs* more, and the *Inward Parts* less.

Experiment
Solitary touch-
ing *Globes*
appearing *Flat*
at *Distance*.

878

ALL *Globes* as farre off appear *Flat*. The *Cause* is, for that *Distance*, being a *Secondary Object of Sight*, is not otherwise discerned, than by more or less *Light*; which *Disparity* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Dusky Paper*: And all *Engravings*, and *Embossings*, (as far off) appear *Plain*.

Experiment
Solitary touch-
ing *Shadows*

879

THe *Uttermost Parts* of *Shadows* seem ever to *Tremble*. The *Cause* is, for that that the little *Moats*, which we see in the *Sun*, do ever Stirre, though there be no *Winde*; And therefore those *Moving*, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, do shew the *Shadow* to *Move*, because the *Medium* Moveth.

Experiments
Solitary touch-
ing the
Rowing and
Breaking of
Seas.

880

Shallow, and *Narrow Seas*, break more than *Deep*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantity of Water*, and likewise *Space Enough*; there the *Water* Rowleth, and Moveth, both more *Slowly*, and with a *Sloper Rise*, and *Fall*: But where there is less *Water*, and less *Space*, and the *Water* dasheth more against the bottom, there it moveth more *Swiftly*, and more in *Pracipice*; For in the *Breaking of the Waves* there is ever a *Pracipice*.

Experiment
Solitary touch-
ing the *Dul-*
curation of
Salt-water.

881

IT hath been observed by the *Ancients*, that *Salt-Water Boiled*, or *Boiled* and *Cooled* again, is more *Potable*, than of it self *Raw*: And yet the *Taste of Salt*, in *Distillations by Fire*, riseth not; For the *Distilled Water* will be *Fresh*.

Fresh. The Cause may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kind* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottom*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For *Simple Distilled Waters* of *Worm-wood*, and the like, are not *Bitter*.

IT hath been set down before, that *Pits* upon the *Sea-Shoar*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some *Places* of *Affrick*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The Cause is, for that after a time, the very *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainer* it selfe is tinted with *Salt*. The Remedy therefore is, to digge still *New Pits*, when the old wax *Brackish*; as if you would change your *Strainer*.

IT hath been observed by the *Ancients*, that *Salt-Water*, will dissolve *Salt*, put into it, in lesse time, than *Fresh-Water* will dissolve it. The Cause may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Substance* draw the *Salt* new put in, unto it, Whereby it diffuseth in the *Liquor* more speedily. This is a *Noble Experiment*, if it be true; For it sheweth Meanes of more *Quick* and *Easie Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Try it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water unsugred*.

PUT *Sugar* into *Wine*, part of it above, part under the *Wine*; And you shall find, that (which may seem strange,) that the *Sugar* above the *Wine*, will soften and dissolve sooner, than that within the *Wine*. The Cause is, for that the *Wine* entreth that *Part* of the *Sugar*, which is under the *Wine*, by *Simple Infusion*, or *Spreading*; But that *Part* above the *Wine*, is likewise forced by *Sucking*: For all *spungie Bodies* expell the *Aire*, and draw in *Liquour*, if it be *Contiguous*: As we see it also in *Sponges*, put part above the *Water*. It is worthy the *Inquiry*, to see how you may make more *Accurate Infusions*, by Helpe of *Attraction*.

WATER in *Wells* is *Warmer* in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The Cause is, for that in the *Higher Parts*, under the *Earth* there is a *Degree* of some *Heat*; as appeareth in *Sulphureous Veines*, &c. Which shut close in, (as in *Winter*,) is the *More*; But if it *Perpire*, (as it doth in *Summer*,) it is the *lesse*.

IT is reported, that amongst the *Leucadians*, in *Ancient time*, upon a *Superstition* they did use to *Precipitate* a *Man*, from a *High Cliffe* into the *Sea*, Tying about him, with *Strings*, at some distance, many great *Fowles*; And fixing unto his *Body* divers *Feathers*; spread, to break the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would bear up a good *Weight*, as they flie; And *Spreading* of *Feathers* thin, and close, and in great Breadth, will likewise bear up a great *Weight*; Being even laid, without *Tilting* upon the *Sides*. The further *Extension* of this *Experiment* for *Flying* may be thought upon.

HERE is, in some *Places*, (namely in *Cephalonia*;) a little *Shrub*, which they call *Holy-Oake*, or *Dwarf-Oake*: Upon the *Leaves* whereof there riseth

Experiment Solitary, touching the Returne of Saltneffe in Pits upon the Sea-Shore. 882

Experiment Solitary, touching Attraction by Similitude of Substance. 883

Experiment Solitary touching Attraction. 884

Experiment Solitary touching Heat under Earth. 885

Experiment Solitary touching Flying in the Aire. 886

Experiment Solitary touching the Die of Scarlet. 887

seth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certain *Red Dust*, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to *Quicken*: With this *Dust* they die *Scarlet*.

Experiment
Solitary, touch-
ing *Malefici-
ating*

888

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany with their *Wives*. The like is Practised in *Gasconie*, Where it is called *Nover l' eguillete*. It is practised always upon the *wedding-Day*. And in *Zant*, the Mothers themselves doe it, by way of *Prevention*; Because thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civil Law* take th knowledge of; And therefore is of no *Light Regard*.

Experiment
Solitary, touch-
ing the
Rise of Water
by *Meanes of*
Flame.

889

IT is a *Common Experiment*, but the *Cause* is mistaken. Take a *Pot*, (Or better a *Glasse*, because therein you may see the *Motion*;) And set a *Candle* lighted in the *Bottom* of a *Bason of Water*; And turne the *Mouth* of the *Pot*, or *Glasse*, over the *Candle*, and it will make the *Water* rise. They ascribe it to the *Drawing of Heat*; Which is not true, For it appeareth plainly to be but a *Motion of Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soon as it is covered, being suffocated by the *Close Aire*, lesseneth by little and little: During which time, there is some little *Ascent of water*, but not much: For the *Flame* Occupying lesse and lesse *Room*, as it lesseneth, the *Water* succeedeth. But upon the *Instant* of the *Candles Going out*, there is a sudden *Rise*, of a great deal of *Water*; For that the *Body* of the *Flame* filleth no more *Place*; And so the *Aire*, and the *Water* succeed. It worketh the same *Effect*, if in stead of *Water*, you put *Flower*, or *Sand*, into the *Bason*: Which sheweth, that it is not the *Flames Drawing* the *Liquor*, as *Nourishment*; As it is supposed; For all *Bodies* are alike unto it; As it is ever in *Motion* of *Nexe*; In somuch as I have seen the *Glasse*, being held by the *Hand*, hath lifted up the *Bason*, and all: The *Motion* of *Nexe* did so *Clasp* the *Bottom* of the *Bason*. That *Experiment*, when the *Bason* was lifted up, was made with *Oile*, and not with *Water*: Nevertheless this is true, that at the very first *Setting* of the *Mouth* of the *Glasse*, upon the *Bottom* of the *Bason*, it draweth up the *Water* a little, and then standeth at a *Stay* almost till the *Candles Going out*, as was said. This may shew come *Attraction* at first: But of this we will speak more, when we handle *Attraction* by *Heat*.

Experiments
in *Confort*,
touching the
Influences of
the *Moon*.

Of the *Power* of the *Celestial Bodies*, and what more *Secret Influences* they have, besides the two *Manifest Influences* of *Heat*, and *Light*, We shall speak, when we handle *Experiments* touching the *Celestial Bodies*: Mean-while, we will give some *Directions* for more certain *Trials*, of the *Vertue* and *Influences* of the *Moon*; which is our *Nearest Neighbour*.

The *Influences* of the *Moon*, (most observed,) are *Four*; The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: The *Increase* of *Moisture*. The *Exciting* of the *Motions* of *Spirits*.

For

890

For the *Drawing* forth of *Heat*, we have formerly prescribed to take *water warm*, and to set Part of it against the *Moon Beams*, and Part of it with a *Screen* between; And to see whether that which standeth Exposed to the *Beams*, will not *Cool* sooner. But because this is but a *Small Interposition*, (though in the *Sun* we see a *Small Shade* doth much,) it were good to try it, when the *Moon* shineth, and when the *Moon* shineth not at all; And with *water warm* in a *Glass-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*, &c.

891

For the *Inducing* of *Putrefaction*, it were good to try it with *Flesh*, or *Fish*, Exposed to the *Moon-Beams*; And again Exposed to the *Air*, when the *Moon* shineth not, for the like time; To see whether will corrupt sooner: And try it also with *Capon*, or some other *Fowl* laid abroad, to see whether it will *Mortifie*, and become tender sooner. Try it also with *Dead Flies*, or *Dead Worms*, having a little *water* cast upon them, to see whether will *Putrifie* sooner. Try it also with an *Apple*, or *Oreng*, having *Holes* made in their *Tops*, to see whether will *Rot* or *Mould* sooner. Try it also with *Holland Cheese*, having *wine* put into it, whether will breed *Mites* sooner, or greater.

892

For the *Increase* of *Moisture*, the Opinion Received is, That *Seeds* will grow soonest; And *Hair*, and *Nails*, and *Hedges*, and *Herbs*, Cut, &c. Will grow soonest, if they be Set or Cut, in the *Increase* of the *Moon*. Also that *Brains* in *Rabbits*, *Wood-Cocks*, *Calves*, &c. are fullest in the *Full* of the *Moon*: And so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you have them in *Pits*.

893

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) And set some of them immediately after the *Change*; and others of the same kind immediately after the *Full*: Let them be as Like as can be: The *Earth* also the Same as near as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Rain*, or *Sun* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what *Time*, the *Seeds* Set in the *Increase* of the *Moon*, come to a certain *Height*; And how they differ from those that are Set in the *Decrease* of the *Moon*.

894

It is like, that the *Brain* of *Man* waxeth *Moister*, and *Fuller*, upon the *Full* of the *Moon*; And therefore it were good for those that have *Moist Brains*, and are great *Drinkers*, to take *Fume* of *Lignum Aloes*, *Rosemary*, *Frankincense*, &c. about the *Full* of the *Moon*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moon* doth; And therefore it were good to Purge some day, or two, after the *Full*; For that then the *Humours* will not replenish so soon again.

895

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbs*, *Hair*, &c. is caused from the *Moon*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*.

896

There may be other *Secret Effects* of the *Influence* of the *Moon*, which are not yet brought into *Observation*. It may be, that if it so fall out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moon*, it increaseth *Cold*; And if *South*, or *South-west*, it disposeth the *Air*, for a good while, to *warmth*, and *Rain*; Which would be observed.

897

It may be, that *Children*, and *Young Cattel*, that are Brought forth in the *Full* of the *Moon*, are stronger, and larger than those that are brought forth in the *Wane*: And those also which are Begotten in the *Full* of the *Moon*; So that it might be good *Husbandry*, to put *Rammes*, and *Bulls* to their

Females, somewhat before the *Full* of the *Moon*. It may be also, that the *Egges* lay'd in the *Full* of the *Moon*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*. *Quare* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moon*.

Experiment
Solitarie, touch-
ing Vinegar.
898

THE Turning of *Wine* to *Vinegar*, is a Kind of *Putrefaction*: And in *Making* of *Vinegar*, they use to set *Vessels* of *Wine* over against the *Noon-Sun*; which calleth out the more *Oylie Spirits*, and leaveth the *Liquor* more *Soure*, and *Hard*. We see also, that *Burnt Wine* is more *Hard*, and *Astringent*, than *Wine unburnt*. It is said, that *Cider* in *Navigations* under the *Line* ripeneth, when *Wine* or *Beer* sowereth. It were good to set a *Rundlet* of *Verjuice* over against the *Sun*, in *Summer*, as they do *Vinegar*, to see whether it will *Ripen*, and *Sweeten*.

Experiment
Solitary, touch-
ing Crea-
tures that
Sleep all win-
ter.
899

THERE be divers *Creatures*, that *Sleep* all *Winter*; As the *Bear*, the *Hedge-Hog*, the *Bat*, the *Bee*, &c. these all wax *Fat* when they *Sleep*, and egest not. The cause of their *Fattening*, during their *Sleeping time*, may be the *want* of *Assimilating*; For whatsoever *Assimilate*th not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping-time*, have been observed not to *Stir* at all; And for the other part, to *Stir*, but not to *Remove*. And they get *Warm* and *Close Places* to *Sleep* in. When the *Flemmings* Wintred in *Nova Zembla*, the *Bears*, about the *Middle* of *November*, went to *sleep*, And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Antients*, that the *She-Bear* breedeth, and lyeth in with her *Young*, during that time of *Rest*: And that a *Bear*, *Big with Young*, hath seldom been seen.

Experiment
Solitary, touch-
ing the
Generation of
Creatures by
Copulating, and
by Putrefaction
900

SOME *Living creatures* are procreated by *Copulation* between *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (nevertheless) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certain, that the *Cause* of all *Vivification*, is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance* being *Glutinous*, produceth two *Effects*: The *One*, that the *Spirit* is detained, and cannot *Break forth*: The *Other*, that the *Matter* being *Gentle*, and *Yeelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*. Therefore all *Sperm*, all *Menstruous Substance*, all *Matter* whercof *Creatures* are produced by *Putrefaction*, have evermore a *Closetness*, *Lentour*, and *Sequacitie*. It seemeth therefore, that the *Generation* by *Sperm* onely, and by *Putrefaction*, have two *Different Causes*. The *First* is, for that *Creatures*, which have a *Definite*, and *Exact Shape*, (as those have which are Procreated by *Copulation*) cannot be produced by a *weak*, and *Casual Heat*; Nor out of *Matter*, which is not *Exactly Prepared*, according to the *Species*. The *Second* is, for that there is a greater time required, for *Maturation* of *Perfect creatures*; For if the *Time* required in *Vivification* be of any length, then the *Spirit* will *Exhale*, before the *Creature* be *Mature*: Except it be inclosed in a *Place* where it may have *Continuance* of the *Heat*, *Access* of some *Nourishment* to maintain it, and *Closetness*, that may keep it from *Exhaling*. And such *Places*

Places, OF the *wombs*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Vncertain Shape*; And are made in *Shorter Time*; And need not so Perfect an *Enclosure*, though some *Closeth* be commonly required. As for the *Heathen Opinion*, which was, that upon great *Mutations* of the *World*, *Perfeet Creatures* were first Eugendred of *Concretion*; As well as *Frogs* and *worms*, and *Flies*, and such like, are now; We know it to be vain: But if any such Thing should be admitted, Discourfing according to *Sense*, it cannot be, except you admit of a *Chaos* first, and *Commixture* of *Heaven* and *Earth*: For the *Frame* of the *world* once in *Order*, cannot effect it by any *Exceffe* or *Casualtie*.

NATV

The first part of the book is a
 history of the city of London
 from the time of its first
 settlement to the present
 time. It is written in a
 plain and simple style, and
 contains a great deal of
 interesting information
 concerning the city and its
 inhabitants. It is a very
 valuable work, and is
 highly recommended to
 all who are interested in
 the history of London.

NATVRALL HISTORIE,

X. Century.



The Philosophie of Pythagoras, (which was full of Superstition,) did first plant a *Monstrous Imagination*, which afterwards was, by the School of Plato, and Others, Watred, and Nourished. It was, That the *World was One, Entire, Perfect, Living Creature*; Inso-much as Apollonius of Tyana, a Pythag re-an Prophet, affirmed that the *Ebbing and Flowing of the Sea, was the Respiration of the World*, drawing in *Water as Breath*, and putting it torth again. They went on, and inferred; That if the *World were a Living Creature*, it had a *Soul*, and *Spirit*; which also they held, calling it *Spiritus Mundi*, The *Spirit or Soul of the World*. By which they did not intend *God*; (for they did admit of a *Deity* besides:) But only the *Soul*, or *Essential Form of the Vniverse*. This *Foundation* being laid, they mought build upon it, what they would; For in a *Living Creature*, though never so great, (As for example, in a great *Whale*), the *Sense*, and the *Affects* of any one *Part of the Body*, instantly make a *Transcur-sion* thorowout the whole *Body*: So that by this they did insinuate, that no distance of *Place*, nor *Want* or *Indisposition of Matter*, could hinder *Magica' Operations*; But that for example, we mought here in *Euwope*, have *Sense* and *Feeling* of that, which was done

Experiments
in Consort,
touching
Transmission
and *Influx* of
Immaterial
Virtues, and
the *Force* of
Imagination.

in *China*: And likewise, we mought work, any *Effect*, without and against *Matter*: And this, not Holden by the *Cooperation* of *Angels*, or *Spirits*, but only by the *Vnity* and *Harmony* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit of Man*, (whom they call the *Microcosm*) do give a fit touch to the *Spirit of the World*, by strong *Imaginations*, and *Beleefs*, it might command *Nature*; For *Paracelsus* and some darksome *Authors*, of *Magick*, do ascribe to *Imagination Exalted*, the *Power of Miracle-Working Faith*: With these *Vast* and *Bottomlesse Follies*, *Men* have been (in part) entertained.

But wee, that hold firm to the *VWorks of God*; And to the *Sense*, which is *Gods Lamp*; (*Lucerna Dei Spiraculum Hominis* ;) will enquire with all *Sobriety*, and *Severitie*, whether there be to be found, in the *Foot-steps of Nature*, any such *Transmission* and *Influx of Immaterial Virtues*; And what the *Force of Imagination* is; Either upon the *Body Imaginant*, or upon another *Body*: VVherein it will be like that *Labour of Hercules*, in *Purging the Stable of Augeas*, to separate from *Superstitious*, and *Magical Arts*, and *Observations*, any thing that is clean, and pure *Natural*; And not to be either *Contemned*, or *Condemned*. And although we shall have occasion to speak of this in more *Places than One*, yet we will now make some *Entrance* thereinto.

Men are to be Admonished, that they do not with-draw *Credit*, from the *Operations* by *Transmission of Spirits*, and *Force of Imagination*, because the *Effects* are sometimes, For as in *Infection*, and *Contagion*, from *Body to Body*, as the *Plague*, and the like, it is most certain, that the *Infection* is received (many times) by the *Body passive*, but yet is by the *Strength*, and good *Disposition* thereof, *Repulsed*, and wrought out, before it be formed in a *Disease*; So much more in *Impressions* from *Mind to Mind*, or from *Spirit to Spirit*, the *Impression* taketh, but is *Encountred*, and *Overcome*, by the *Mind* and *Spirit*, which is *Passive*, before it work any manifest *Effect*. And therefore they work most upon *weak Minds*, and *Spirits*: As those of *Women*; *Sick Persons*; *Superstitious* and *Fearful Persons*; *Children* and *Young Creatures*.

Nescio quis teneros oculus mihi fascinat Agnos :

The *Poet* speaketh not of *Sheep*, but of *Lambs*. As for the *weaknesse* of the *Power* of them, upon *Kings*, and *Magistrates*; It may be ascribed (besides the main, which is the *Protection of God*, over those that *Execute* his *Place*,) to the *weaknesse* of the *Imagination* of the *Imaginant*: For it is hard for a *Witch*, or a *Sorcerer*, to put on a *Belief*, that they can hurt such *Persons*.

Men are to be admonished, on the other side, that they doe not easily give *Place* and *Credit* to these *Operations*, because they *Succeed many times*:

For

Expiments
in Confort,
Monitory,
touching
Transmission of
Spirits, and
the Force of
Imagination.

901

902

For the Cause of this *Succeſſe*, is (oft) to be truly aſcribed, unto the Force of *Affection* and *Imagination*, upon the *Body Agent*; And then by a *Secondary Means*, it may work upon a *Divers Body*: As for example; If a *Man* carry a *Planets Seal*, or a *Ring*, or ſome Part of a *Beaſt*, believing ſtrongly, that it will help him to obtain his *Love*; Or to keep him from danger of hurt in *Fight*; Or to prevail in a *Sute*; &c. it may make him more *Active*, and *Induſtrious*; And again, more *Confident*, and *Perſiſting*, than otherwiſe he would be. Now the great *Effects* that may come of *Induſtry*, and *Perſeverance*, (eſpecially in *Civil Buſineſſe*), who knoweth not? For we ſee *Audacity* doth almoſt bind and mate the *weaker Sort of Minds*; And the *State of Humane Actions* is ſo variable, that to try things oft, and never to give over, doth Wonders: Therefore it were a *Meer Fallacy* and *Miſtaking*, to aſcribe that to the *Force of Imagination*, upon another *Body*, which is but the *Force of Imagination* upon the *Proper Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, work greatly upon the *Body of the Imaginant*: As we ſhall ſhew in due place.

Men are to be Admoniſhed, that as they are not to miſtake the *Causes* of theſe *Operations*; So, much leſſe, they are to miſtake the *Faſt*, or *Effect*; And raſhly to take that for done, which is not done. And therefore, as divers wiſe *Judges* have preſcribed, and cautioned, *Men* may not too raſhly believe, the *Confefſion of Witches*, nor yet the *Evidence* againſt them. For the *Witches* themſelves are *Imaginative*, and believe oft-times, they doe that, which they do not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Natural Operations*, to *Witch-Craft*. It is worthy the *Obſerving*, that both in *Antient*, and *Late times*; (As in the *Theſſalian Witches*, and the *Meetings of Witches* that have been recorded by ſo many late *Confefſions*;) the great *Wonders* which they tell, of *Carrying* in the *Air*; *Transforming* themſelves into other *Bodies*, &c. are ſtill reported to be wrought, not by *Incantation* or *Ceremonies*; but by *Ointments*, and *Anointing* themſelves all over. This may juſtly move a *Man* to think, that theſe *Fables* are the *Effects* of *Imagination*: For it is certain, that *Ointments* do all, (if they be laid on any thing thick,) by *Stopping* of the *Pores*, ſhut in the *Vapours*, and ſend them to the *Head* extremely. And for the *Particular Ingredients* of thoſe *Magical Ointments*, it is like they are *Opiate*; and *Soporiferous*. For *Anointing* of the *Fore-head*, *Neck*, *Feet*, *Back-Bone*, we know is uſed for *Procuring Dead Sleeps*: And if any *Man* ſay, that this *Effect* would be better done by *Inward Potions*; Anſwer may be made, that the *Medicines*, which go to the *Ointments*, are ſo ſtrong, that if they were uſed inwards, they would kill thoſe that uſe them: And therefore they work *Potently*, though *Outwards*.

¶ Wee will divide the *Severall Kinds* of the *Operations*, by *Transmission of Spirits*, and *Imagination*; Which will give no ſmall *Light* to the *Experiments* that follow. All *Operations* by *Transmission of Spirits*, and *Imagination* have this; That they *Work at Diſtance*, and not at *Touch*; And they are theſe being *distinguished*.

The *Fiſt* is the *Transmission* or *Emission*, of the *Thinner* and more *Airy Parts* of *Bodies*; As in *Odours*, and *Infection*s; And this is, of all the reſt, the moſt *Corporeal*. But you muſt remember withall, that there be a number of theſe *Emissions*, both *Vnwholeſome*, and *wholeſome*, that give no *Smell* at all:

For

For the *Plague*, many times when it is taken, giveth no *Sent* at all : And there be many *Good* and *Healthfull* *Airs*, that do appear by *Habitation*, and other *Proofs*, that differ not in *Smell* from other *Airs*. And under this *Head*, you may place all *Imbibitions* of *Air*, where the *Substance* is *Material*, *Odour-like*; Whereof some nevertheleffe are strange, and very suddenly diffused; as the *Alteration* which the *Air* receiveth in *Egypt*, almost immediately, upon the *Rising* of the *River* of *Nilus*, whereof we have spoken.

905 The Second is, the *Transmission* or *Emission* of those *Things* that we call *Spiritual Species*; As *Visibles*, and *Sounds*: The one whereof we have handled; and the other we shall handle in due place. These move swiftly, and at great distance; But then they require a *Mediums* well disposed; And their *Transmission* is easily stopped.

906 The third is, the *Emissions*, which cause *Attraction* of *Certain Bodies* at *Distance*; Wherein though the *Loadstone* be commonly placed in the *First Rank*, yet we think good to except it, and refer it to another *Head* : but the *Drawing* of *Amber*, and *Iet*, and other *Electric Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at distance; And the *Attraction* of *Heat* at distance; And that of *Fire* to *Naphtha* ; And that of some *Herbs* to *Water*, though at distance; And divers others; Wee shall handle, but yet not under this present *Title*, but under the *Title* of *Attraction* in general.

907 The Fourth is, the *Emission* of *Spirits*, and *Immaterial Powers* and *Virtues*, in those *Things* which work by the *Universal Configuration*, and *Sympathy* of the *World*; Not by *Forms*, or *Celestial Influxes*, (as is vainly taught and received;) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kind is, (as we yet suppose,) the *working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this kind is the *Motion* of *Gravity*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth* : Of this kind is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West* : Of which kind we conceive the *Main Float* and *Refloat* of the *Sea* is, which is by *Consent* of the *Universe*, as *Part* of the *Diurnal Motion*. These *Immaterial Virtues* have this *Property* differing from others; That the *Diversity* of the *Medium* hindereth them not; But they passe through all *Mediums*; yet at *Determinate Distances*. And of these we shall speak, as they are incident to several *Titles*.

908 The Fifth is, the *Emission* of *Spirits*; And this is the *Principal* in our *Intention* to handle now in this *Place* : Namely, the *Operation* of the *Spirits* of the *Mind* of *Man*, upon other *Spirits*: And this is of a *Double Nature* : The *Operations* of the *Affections*, if they be *Vehement*; And the *Operation* of the *Imagination*, if it be *Strong*. But these two are so *Coupled*, as we shall handle them together; For when an *Envious* or *Amorous Aspect*, doth infect the *Spirits* of *Another*, there is *Joyned* both *Affection*, and *Imagination*.

909 The Sixth is, the *Influxes* of the *Heavenly Bodies*, besides those two *Manifest Ones*, of *Heat*, and *Light*: But these we will handle, where we handle the *Celestial Bodies*, and *Motions*.

910 The Seventh is, the *Operations* of *Sympathy*; Which the *writers* of *Natural Magick* have brought into an *Art* or *Precept* : And it is this ; That if you desire to *Super-induce*, any *Virtue* or *Disposition*, upon a *Person*, you should take the *Living Creature*, in which that *Virtue* is most *Eminent*. and in *Perfection*: Of that *Creature* you must take the *Parts* wherein that *Virtue* chiefly is *Collocate*: Again, you must take the *Parts* in the *Time*, and *Age* when that *Virtue* is most in *Exercise* ; And then you must apply it to that

Part of Man, wherein that *Virtue* chiefly *Consisteth*. As if you would *Superinduce Courage and Fortitude*, take a *Lion*, or a *Cock*; And take the *Heart, Tooth, or Paw* of the *Lion*; Or the *Heart, or Spur* of the *Cock*: Take those *Parts* immediately after the *Lion*, or the *Cock* have been in *Fight*; And let them be worn, upon a *Mans-Heart, or Wrest*. Of these and such like *Sympathies*, we shall speak under this present *Title*.

The Eighth and last is, an *Emission of Immaterial Virtues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly avouched by many: And we have set it down, as a Law to our Selves, to examine things to the Bottom; And not to receive upon Credit; or reject upon Improbabilities, untill there hath passed a due Examination. This is, the *Sympathy of Individuals*: For as there is a *Sympathy of Species*; So, (it may be) there is a *Sympathy of Individuals*: That is, that in *Things*, or the *Parts of Things* that have been once *Contiguous*, or *Entire*, there should remain a *Transmission of Virtue* from the one to the other: As between the *Weapon*, and the *wound*. Whereupon is blazed abroad the *Operation of Vnquentem Teli*: And so of a *Peeces of Lard*, or *Stick of Elder*, &c. that if *Part* of it be Consumed or Purified, it will work upon the other *Parts Severed*. Now we will pursue the *Instances* themselves.

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The *Plague* is many times taken without *Manifest Sense*, as hath been said. And they report, that where it is found, it hath a Sent of the *Smell of a Mellow Apple*; And (as some say) of *May Flowers*: And it is also received, that *Smells of Flowers* that are *Mellow and Lushious*, are ill for the *Plague*; As *White-Lillies, Cosslips, and Hyacinths*.

Experiments in Confort, tonching Emission of Spirits in Va-pour, or Ex-halation, Odour-like.

The *Plague* is not easily received by such, as continually are about them, that have the *Plague*, As *Keepers of the Sick*, and *Physitians*; Nor again by such as take *Antidotes*, either Inward, (as *Mithridate, Juniper-Berries, Rue, Leaf, and Seed, &c.*) Or Outward, (as *Angelica, Zedoary, and the like, in the Mouth; Tarre, Galbanum, and the like, in Perfume;*) Nor again by *Old People* and such as are of a *Drie and cold complexion*. On the other side, the *Plague* taketh soonest hold of those that come out of a *Fresh Air*; and of those that are *Fasting*; and of *children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*.

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The most pernicious *Infection*, next the *Plague*, is the *Smell of the Layl*, when *Prisoners* have been Long, and Close, and Nastily kept; Whereof we have had, in our time, experience, twice or thrice; when both the *Judges* that sat upon the *Layl*, and *Numbers* of those that attended the *Businesse*, or were present, *Sickned* upon it, and *died*. Therefore it were good wisdom, that in such Cases, the *Layl* were *Aired*, before they be brought forth.

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Out of question, if such *Foul Smells* be made by *Art*, and by the *Hand*, they consist chiefly of *Mans Flesh, or Sweat, Purified*: For they are not those *Stinks*, which the *Nostrils* straight abhor, and expell, that are most *Pernicious*; But such *Airs*, as have some similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger, in using such *Compositions*, in great Meetings of *People*, within *Houles*; As in *Churches*; At *Arraigments*; At *Playes* and *Solemnities*; And the like; For *Poysoning of Air* is no lesse dangerous than *Poysoning of water*; Which hath been used by the *Turks* in the *Warrs*; And was used by *Emanuel Comnenus* towards the *Christians*, when they passed thorow his *Country* to the *Holy Land*. And these *Empoysonments of Air*, are the more dangerous in *Meetings of People*; Because the much *Breath of People*, doth further the *Reception* of the

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the *Infection*: And therefore, when any such thing is feared, it were good, those *Publick Places* were perfumed, before the *Assemblies*.

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The *Empoysonment* of Particular *Persons*, by *Odours*, hath been reported to be in *Perfumed Gloves*, or the like. And it is like, they mingle the *Poyson* that is deadly, with some *Smells* that are Sweet, which also maketh it the sooner received. *Plagues* also have been raised by *Annointings* of the *Chincks* of *Doors*, and the like; Not so much by the *Touch*, as for that it is common for *Men*, when they find any thing *Wet* upon their *Fingers*, to put them to their *Nose*; Which *Men* therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Airs*, cannot be made without *Dangers* of *Death*, to them that make them. But then again, they may have some *Antidotes* to save themselves; So that *Men* ought not to be secure of it.

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There have been, in divers *Countries*, great *Plagues* by the *Putrefaction*, of great *Swarms* of *Grasse-Hoppers*, and *Locusts*, when they have been dead, and cast upon *Heaps*.

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It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Mineral*: And those that deal much in *Refining*, or other *Works* about *Metals*, and *Minerals*, have their *Brains* Hurt and *Stupified* by the *Metalline Vapours*. Amongst which it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; Inasmuch as *Gilders* use to have a peece of *Gold* in their *Mouth*, to draw the *Spirits* of *Quick-Silver*; Which *Gold* afterwards they find to be *Whitened*. There are also certain *Lakes*, and *Pis*, such as that of *Avernus*, that *Poyson Birds*, (as is said,) which fly over them; Or *Men*, that stay too long about them.

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The *Vapour* of *Char-coal*, or *Sea-coal*, in a *Close Room*, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little and little; Enducing only *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more *Sticks*, they fell to make *Fire* of some *Sea-coal* they had, wherewith (at first) they were much refreshed; But a little after they had sat about the *Fire*, there grew a general *Silence* and lothnesse to speak amongst them; And immediately after, One of the *weakest* of the *Company*, fell down in a *Swoun*; Whereupon they doubting what it was, opened their door, to let in *Air*, and so saved themselves. The *Effect* (no doubt) is wrought by the *Inspiration* of the *Air*; And so of the *Breath*, and *Spirits*. The like ensueth in *Rooms* newly *Plastered*, if a *Fire* be made in them; Wherof no lesse *Man* than the *Emperour Iovinianus* Died.

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Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Air* upon the first *Showrs*, after long *Drough*.

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It hath come to passe, that some *Apothecaries*, upon *Stamping* of *Coloquintida*, have been put into a great *Skouring*, by the *Vapour* only.

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It hath been a practice, to burn a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it provoketh a *Continual Sneezing*, in those that are in the *Room*,

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It is an *Antient Tradition*, that *Blear-Eyes* infect *Sound Eyes*; And that a *Menstruous Woman*, looking in a *Glasse*, doth rust it. Nay they have an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going over a *Field*, or *Garden*, do *Corn* and *Herbs* good by *Killing* the *worms*.

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The *Tradition* is no lesse *Antient*, that the *Basilisk* killeth by *Aspect*; And that

that the *Wolf*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

Perfumes Convenient do dry and strengthen the *Brain*; And stay *Rheums* and *Defluxions*; As we find in *Fume* of *Rosemary* dried, and *Lignum Aloes*, and *Calamus* taken at the *Mouth*, and *Nostrils*; And no doubt there be other *Perfumes*, that do moisten, and refresh; and are fit to be used in *Burning Agues*, *Consumptions*, and too much *wakefulness*; Such as are *Rose-water*, *Vinegar*, *Lemmon-Pils*, *Violets*, the *Leaves of Vines* sprinkled with a little *Rose-water*, &c.

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They doe use in *Sudden Faintings*, and *Swounings*, to put a *Handkerchief* with *Rose-water*, or a little *Vinegar*, to the *Nose*; Which gathereth together again the *Spirits*, which are upon point to resolve, and fall away.

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Tobacco comforteth the *Spirits*, and dischargeth *weariness*; Which it worketh, partly by *Opening*, but chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to trie the taking of *Fumes* by *Pipes*, (as they doe in *Tobacco*) of other *Things*; As well to dry and comfort, as for other *Intentions*. I wish *Trial* be made of the *Drying Fume* of *Rosemary*, and *Lignum Aloes*, before mentioned, in *Pipe*; And so of *Nutmegs*, and *Folium Indum*, &c.

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The *Following* of the *Plough* hath been approved, for *Refreshing* the *Spirits*, and procuring *Appetite*: But to doe it in the *Ploughing* for *wheat*, or *Rye*, is not so good; because the *Earth* hath spent her sweet *Breath*, in *Vegetables* put forth in *Summer*. It is better therefore to doe it when you Sow *Barley*. But because *Ploughing* is tied to *Seasons*, it is best to take the *Air* of the *Earth*, new turned up by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlemen* may doe themselves much good by kneeling upon a *Cushion*, and *weeding*. And these things you may practise in the best *Seasons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also when the *Dew* is a little off the *Ground*, lest the *Vapour* be too *Moist*. I knew a great *Man* that lived *Long*, who had a *Clean Clod* of *Earth*, brought to him every *Morning*, as he fate in his *Bed*; And he would hold his *Head* over it, a good pretty while. I commend also, sometimes in *Digging* of *New Earth*, to pour in some *Malmsey*, or *Greek Wine*; That the *Vapour* of the *Earth*, and *wine* together, may comfort the *Spirits* the more; Provided alwaies, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

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They have, in *Physick*, Use of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheums*, *Comforting* of the *Heart*, *Provoking* of *Sleep*, &c. For though those things be not so strong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*; And besides, there be divers *Things* that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*, the *Seed* of *Melanthium*, *Amomum*, &c.

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There be two *Things*, which (inwardly used) doe *Cool* and condense the *Spirits*; And I wish the same to be tried outwardly in *Vapours*. The *One* is *Nitre*, Which I would have dissolved in *Malmsey*, or *Greek-Wine*, and so the *Smell* of the *wine* taken; Or if you would have it more forcible, pour of it upon a *Fire-pan*, well heated, as they do *Rose-water* and *Vinegar*. The *Other* is, the *Distilled water* of *Wild Poppe*; which I wish to be mingled, at half, with *Rose-water*, and so taken with some mixture of a few *Cloves*, in a *Perfuming-Pan*. The like would be done with the *Distilled water* of *Saffron Flowers*.

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931 Smells of Musk, and Amber, and Civit, are thought to further *Venerous Appetite*: which they may doe by the *Refreshing* and *calling forth* of the *Spirits*.

932 *Incense*, and *Nidorous Smels* (such as were of *Sacrifices*) were thought to Intoxicate the *Brain*, and to dispose *Men* to *Detotion*: Which they may do by a kind of *Sadness*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. We see that amongst the *Jews*, the *Principal Perfume* of the *Sanctuary* was forbidden all *Common Uses*.

933 There be some *Perfumes*, prescribed by the *Writers of Natural Magick*, which procure *Pleasant Dreams*; And some others (as they say) that procure *Prophetical Dreams*, as the *Seeds of Flax, Flea-wort, &c.*

934 It is certain, that *Odours* do, in a small Degree, *Nourish*; Especially the *Odour of Wine*: And we see *Men* an hungred, doe love to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the *House*, complain, that she should be kept from being at a *Feast*, and *Solemnity* (which she much desired to see) because there would be a *Corpse* in the *House*; Whereupon he caused *Loaves of New Bread* to be sent for, and opened them; And poured a little *Wine* into them; And so kept himself alive with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three, or four, yea five daies, without *Meat, Bread, or Drink*; But the same *Man* used to have continually, a great *Wisp* of *Herbs*, that he smelled on: And amongst those *Herbs*, some *Esculent Herbs*, of strong *Sent*; As *Onions, Garlick, Leeks*, and the like.

935 They doe use for the *Accident* of the *Mother*, to burn *Feathers*, and other *Things of Ill Odour*: And by those *Ill Smels*, the *Rising* of the *Mother* is put down.

936 There be *Airs*, which the *Physicians* advise their *Patients* to remove unto, in *Consumptions*, or upon *Recovery* of *Long Sicknesses*: Which (commonly) are *Plain Champaigns*, but *Grafsing*, and not *Over-grown* with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groves* of *Bayes*, doe forbid *Pestilent Aires*; Which was accounted a great *Cause* of the *Wholesome Air* of *Antiochia*. There be also some *Soyles* that put forth *Odorate Herbs* of themselves; As *Wild Thyme; Wild Marjoram; Penney-Royal, Camomil*; And in which the *Briar-Roses* smell almost like *Musk-Roses*; Which (no doubt) are *Signs* that doe discover an *Excellent Air*.

937 It were good for *Men* to think of having *Healthfull Air*, in their *Houses*; Which will never be, if the *Rooms* be *Low-Roofed*, or full of *Windows*, and *Doors*; For the one maketh the *Air Close*, and not *Fresh*; And the other maketh it *Exceeding Vnequal*; Which is a great *Enemy* to *Health*. The *Windows* also should not be high up to the *Roof* (which is in use for *Beauty* and *Magnificence*) but *Low*. Also *Stone-walls* are not *wholesom*; But *Timber* is more *wholesome*, and especially *Brick*: Nay it hath been used by some, with great *Success*, to make their *walls* thick; And to put a *Lay* of *Chalk* between the *Bricks*, to take away all *Dampishness*.

Experiment
Solitary, touch-
ing the
Emissions of
Spiritual Spe-
cies which
affect the
Senses,

THESE *Emissions* (as we said before) are handled, and ought to be handled, by themselves, under their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to give some general *Observations*, Common to both. First, they seem to be *Incorporeal*. Secondly, they *Work Swiftly*. Thirdly, they *Work at Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effective* of any *Thing*; Nor leave no

Work behind them; But are *Energies* meerly; for their *Working* upon *Mirrors*, and *Places of Echo*, doth not alter any thing in those *Bodies*; But it is the same *Action* with the *Original*, onely *Repercussed*. And as for the *Shaking* of *Windows*, or *Raryfying* the *Air* by *Great Noises*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seem to be of so *Tender*, and *Weak* a *Nature*, as they affect onely such a *Rare*, and *Attenuate Substance*, as is the *Spirit of Living Creatures*.

It is mentioned in some *Stories*, that where *Children* have been *Exposed*, or taken away young from their *Parents*; And that afterward they have approached to their *Parents* presence, the *Parents* (though they have not known them) have had a *Secret Joy*, or other *Alteration* thereupon.

There was an *Egyptian South-Sayer*, that made *Anthonium* believe, that his *Genius* (which otherwise was *Brave*, and *Confident*) was, in the Presence of *Octavianus Caesar*, *Poor*, and *Cowardly*: And therefore he advised him, to absent himself (as much as he could,) and remove far from him. The *South-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Egypt*, and other *Remote Places* from *Rome*. Howsoever the *Conceit* of a *Predominant* or *Mastering Spirit* of one *Man* over *Another*, is *Antient*, and Received still, even in *Vulgar Opinion*.

There are *Conceits*, that some *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to be *Sad*, and *Ill disposed*; And contrariwise, that *Others*, that are of a *Jovial Nature*, do dispose the *Company* to be *Merry* and *Cheerfull*. And again, that some *Men* are *Luckie* to be kept *company* with, and *Employed*; And others *Unlucky*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence* one with another, as well as from *Body* to *Body*.

It hath been observed, that *Old Men* who have loved *Young company*, and been *Conversant* continually with them, have been of *Long Life*; Their *Spirits* (as it seemeth,) being *Recreated* by such *company*. Such were the *Antient sophists*, and *Rhetoricians*; Which ever had *young Auditors*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who lived till they were an *Hundred years Old*. And so likewise did many of the *Grammarians*, and *School-Masters*; such as was *Orbilius*, &c.

Audacity and *Confidence* doth, in *Civil Business*, so great *Effects*, as a *Man* may (reasonably) doubt, that besides the very *Daring* and *Earnestness*, and *Persisting*, and *Importunity*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits* to such *Persons*.

The *Affections* (no doubt) do make the *Spirits* more *Powerfull* and *Active*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Love*, and *Envy*, which is called *Oculus Malus*. As for *Love*, the *Platonists* (some of them) go so farre, as to hold that the *Spirit* of the *Lover*, doth pass into the *Spirits* of the *Person Loved*; Which causeth the desire of *Return* into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contract* and *Conjunction*, which is in *Lovers*. And this is observed likewise, that the *Aspects* that procure *Love*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Envy*, that emitteth some *Malign* and *Peyssonous Spirits*, which taketh hold of the *Spirit* of *Another*; And is likewise of greatest *Force*, when the *Cast* of the *Eye* is *Oblique*. It hath been noted also, that it is most *Dangerous*, where the

Experiments in Confort, touching Emission of Immateriate Vertues from the Minds and Spirits of Men, either by Affections, or by Imaginations, or by other Impressions.

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Envious Eye is cast upon *Persons in Glory*, and *Triumph*, and *Joy*. The *Reason* whercof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Envious Eye*, more at *Hand*: And therefore it hath been noted, that after great *Triumphs*, *Men* have been ill disposed for some dayes following: We see the *Opinion of Fascination* is *Antient*; for both *Effects*; Of *Procuring Love*; And *sickness* caused by *Envie*: And *Fascination* is ever by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most forcibly by the *Eye*.

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Fear, and *Shame*, are likewise *Infective*; for we see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalf.

Now we will speak of the *Force of Imagination* upon other *Bodies*; and of the *Means* to *Exalt* and *Strengthen* it: *Imagination*, in this Place, I understand to be, the *Representation* of an *Individual Thought*. *Imagination* is of three *Kinds*: The *First* *Joynd* with *Belief* of that which is to *Come*; The *Second* *Joynd* with *Memorie* of that which is *Past*; And the *Third* is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imagination Feigned*, and at *Pleasure*; As if one should *Imagine* such a *Man* to be in the *Vestments* of a *Pope*; Or to have *Wings*. I single out, for this time, that which is, with *Faith*, or *Belief* of that which is to *Come*. The *Inquisition* of this *Subject*, in our way, (which is by *Induction*,) is wonderfull hard; For the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly bee made, but with *Extreme Caution*; For the *Reason* which wee will after declare.

The *Power of Imagination* is in three *Kinds*; The *First*, upon the *Body* of the *Imaginant*; Including, likewise the *Child* in the *Mothers Womb*; The *Second* is, the *Power* of it upon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metal*, &c. The *Third* is, the *Power* of it, upon the *Spirits* of *Men*, and *Living Creatures*; And with this last we will onely meddle.

The *Probleme* therefore is, whether a *Man Constantly*, and *Strongly Beleeving*, that such a *Thing* shall be; (As that such an *One* will *Love Him*; Or, that such an *One* will *Grant Him* his *Request*; Or, that such an *One* shall *Recover* a *Sickness*; Or the like;) It doth help any thing to the *Effecting* of the *Thing* it self. And here again we must warily distinguish; For it is not meant (as hath been partly said before) that it should help by *Making* a *Man More Stout*, or more *Industrious*; (in which kinde *Constant Belief* doth much;) But meerly by a *Secret Operation*,

ration, or Binding, or Changing the Spirit of Another: And in this it is hard (as we began to say) to make any *New Experiment*; for I cannot command my self to Believe what I will, and so no *Trial* can be made: Nay it is worse; For whatsoever a *Man Imagineth doubtfully*, or with *Fear*, must needs doe hurt, if *Imagination* have any *Power* at all: for a *Man* representeth that oftner, that he feareth, than the contrary.

The help therefore is, for a *Man* to work by *Another*, in whom he may Create *Belief*, and not by *Himself*; untill *Himself* have found by *Experience*, that *Imagination* doth prevail: for then *Experience* worketh in *Himself* *Belief*; if the *Belief*, that such a *Thing* shall be, be joynd with a *Belief* that his *Imagination* may procure it.

For example, I related one time to a *Man*, that was Curious and Vain enough in these Things, *That I saw a kind of Jugler, that had a Pair of Cards, and would tell a Man what Card he thought*. This Pretended learned Man told me, It was a mistaking in me; For (said he) it was not the Knowledge of the Mans Thought (for that is proper to God) but it was the Inforcing of a Thought upon him, and Binding his *Imagination* by a Stronger; that he could Think no other Card. And therupon he asked me a *Question* or two, which I thought he did but cunningly, knowing before what used to be the *Feats* of the *Jugler*. Sir (said he) do you remember whether he told the Card, the Man thought, Himself, or bade Another to tell it? I answered (as was true) That he bade Another tell it. Whereunto he said, So I thought: For (said he) Himself could not have put on so strong an *Imagination*; But by telling the other the Card (who beleeved that the *Jugler* was some *Strange Man*, and could do *strange Things*) that other Man caught a *strong Imagination*: I hearkened unto him, thinking for a *Vanitie* he spake prettily. Then he asked me another *Question*: Saith he, Do you remember, whether he bade the Man think the Card first, and afterwards told the other Man in his Ear what he should think; Or else that he did whisper first in the Mans Ear, that should tell the Card, telling that such a Man should think such a Card, and after bade the Man think a Card? I told him (as was true,) That he did first whisper the Man in the Ear, that such a Man should think such a Card: Upon this the *Learned Man* did much *Exult*, and Please himself, saying; Lo, you may see that my Opinion is right: For if the Man had thought first, his Thought had been fixed: But the other *Imagining* first, bound his Thought. Which though it did somewhat sink with me, yet I made it Lighter than I thought, and said; I thought it was *Confederacie* between the *Jugler*, and the two *Servants*: Though (indeed) I had no Reason so to think: For they were both my *Fathers* servants; And he had never plaid in the House before. The *Jugler* also did cause a *Garter* to be held up; And took upon him, to know, that such an *One*, should point in such a *Place* of the *Garter*; As it should be near so many *Inches* to the *Longer end*, and so many to the *Shorter*; And still he did it, by *First Telling* the *Imaginer*, and after *Bidding* the *Assour Think*.

Having told this *Relation*, not for the *Weight* thereof, but because it doth handsomly open the *Nature* of the *Question*; I return to

that I said ; That *Experiments of Imagination*, must be practised by others, and not by a *Mans* self. For there be Three means to fortifie *Belief* : The first is *Experience* ; the Second is *Reason* ; and the Third is *Authoritie* ; And that of these, which is farre the most Potent, is *Authoritie* : For *Belief* upon *Reason*, or *Experience*, will Stagger.

947

For *Authority*, it is of two Kinds ; *Belief* in an *Art* ; And *Belief* in a *Man*. And for Things of *Belief* in an *Art*, A *Man* may exercise them by *Himself* ; But for *Belief* in a *Man*, it must be by *Another*. Therefore if a *Man* beleeve in *Astrologie*, and find a *Figure* prosperous ; Or beleeve in *Natural Magick*, and that a *Ring* with such a *Stone*, or such a *Peeces* of a *Living Creature*, Carried, will do good ; It may help his *Imagination* : But the *Belief* in a *Man* is far the more *Astrive*. But howsoever, all *Authority* must be out of a *Mans* self, turned (as was said) either upon an *Art*, or upon a *Man* ; and where *Authority* is from one *Man* to another, there the second must be *Ignorant*, and not *Learned*, or *Full of Thoughts* ; And such are (for the most part) all *witches* and *Superstitious Persons* ; Whose *Beliefs*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience*. And upon the same *Reason*, in *Magick*, they use (for the most part) *Boys*, and *Young People* ; whose *Spirits* easilicst take *Belief*, and *Imagination*.

Now to fortifie *Imagination*, there be three wayes ; the *Authoritie* whence the *Belief* is derived ; *Meanes* to *Quicken* and *Corroborate* the *Imagination* ; And *Meanes* to *Repeat* it, and *Refresh* it.

948

For the *Authority*, we have already spoken : As for the Second ; Namely, the *Meanes* to *Quicken* and *Corroborate* the *Imagination* ; We see what hath been used in *Magick* ; (If there be in those Practices any thing that is purely *Natural* ;) As *Vestments*, *Characters*, *Words*, *Seals* ; Some parts of *Plants*, or *Living Creatures* ; *Stones* ; *Choice of the Hour* ; *Gestures*, and *Motions* ; Also *Incenses* and *Odours* ; *Choice of Society*, which increaseth *Imagination* ; *Dyets*, and *Preparations* for some time before. And for *Words*, there have been ever used, either *Barbarous Words* of no *Sense*, lest they should disturb the *Imagination* ; Or *Words of Similitude*, that may second and feed the *Imagination* : And this was ever as well in *Heathen Charms*, as in *Charms* of later Times. There are used also *Scripture-words* ; For that the *Belief*, that *Religious Texts* and *words* have Power, may strengthen the *Imagination*. And for the same Reason, *Hebrew Words* (which amongst us is counted the *Holy-Tongue*, and the *Words* more *mystical*) are often used.

949

For the *Refreshing* of the *Imagination* (which was the Third *Means* of *Exalting* it) We see the practices of *Magick*, as in *Images* of *wax*, and the like, that should Melt by little and little ; Or some other *Things* Buried in *Muck*, that should Putrifie by little and little ; Or the like : For so oft as the *Imaginant* doth think of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

950

If there be any Power in *Imagination*, it is lesse credible, that it should be so *Incorporeal* and *Immaterial* a *Virtue*, as to work at great *Distances* ; Or, through all *Mediums* ; Or upon all *Bodies* ; But that the *Distance* must be competent ; The *Medium* not *Adverse* ; And the *Bodie* Apt and Proportionate. Therefore if there be any operation upon *Bodies*, in Absence by Nature ;

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it is like to be conveyed from *Man* to *Man*, as *Fame* is ; As if a *Witch*, by *I*magination, should hurt any a far off, it cannot be naturally, but by Working upon the *Spirit* of some, that cometh to the *Witch*; And from that party upon the *Imagination* of Another; And so upon Another; till it come to one that hath resort to the *Parie intended* ; and so by *Him* to the *Party intended himself*. And although they speak that it sufficeth, to take a *Point*, or a *Peeces* of the *Garment*, or the *Name* of the party, or the like ; yet there is less Credit to be given to those Things, except it be by *working* of *evil Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, upon other *Bodies*, are few or none ; for the *Experiments* of *Whitchcraft*, are no clear *Proofs* ; For that they may be, by a *Tacit Operation* of *Malign Spirits* : We shall therefore be forced in this *Enquirie*, to resort to *New Experiments*: Wherein we can give onely *Directions* of *Trials*, and not any *Positive Experiments*. And if any man think ; that we ought to have stayed, till we had made *Experiment* of some of them our selves, (as we do *Commonly* in other *Titles* ,) the truth is, that these *Effects* of *Imagination* upon other *Bodies*, have so little *Credit* with us, as we shall trie them at leisure : But in the mean time, we will lead others the way.

When you work by the *Imagination* of another, it is necessary, that He, by whom you work, have a *Precedent Opinion* of you, that you can doe *Strange Things*; Or that you are a *Man of Art*, as they call it ; For else the *Simple Affirmation* to Another, that this or that shall be, can work but a weak *Impression* in his *Imagination*.

951

It were good, because you cannot discern fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did use the *Imagination* of more than *One*; That so you may light upon a *Strong One*. As if a *Physician* should tell *Three*; or *Four* of his *Patients Servants*, that their *Master* shall surely recover.

952

The *Imagination* of one, that you shall use (such is the *Variety* of *Mens Minds*) cannot be alwaies alike *Constant*, and *Strong*; And if the *Successes* follow not speedily, it will faint and leese *Strength*. To remedy this, you must pretend to *Him*; whose *Imagination* you use, several degrees of *Means* by which to *Operate*; As to prescribe him, that every *Three Daies*; if he find not the *Success* Apparent, he doe use another *Root*, or *Part* of a *Beast*; or *Ring*, &c. As being of more *Force*; And if that fail, Another; And if that, Another, till *Seven times*. Also you must prescribe a good *Large Time* for the *Effect* you promise ; As if you should tell a *Servant* of a *Sick man*, that his *Master* shall recover, but it will be *Fourteen daies*, ere he findeth it apparently, &c. All this to entertain the *Imagination*, that it waver less.

953

It is certain, that *Potions*, or *Things* taken into the *Body* : *Incenses* and *Perfumes* taken at the *Nostrils* ; And *Oyntments* of some *Parts*, doe (naturally) work upon the *Imagination* of *Him* that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you use, if you prescribe him, before he doe use the *Receipt*, for the *Work* which he desireth, that he doe take such a *Pill*, or a *Spoonfull* of *Liquor* ; Or burn such an *Incense*; Or *Annoint* his *Temple*, or the *Soles* of his *Feet*, with such an *Ointment*,

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ment or Oyle: And you must chuse, for the *Composition* of such *Pill*, *Perfume*, or *Oynment*, such *Ingredients* as doe make the *Spirits* a little more *Grosse*, or *muddy*; Whereby the *Imagination* will fix the better.

955

The *Body Passive*, and to be wrought *Vpon*, (I mean not of the *Imaginant*) is better wrought upon, (as hath been partly touched) at some *Times*, than at others: as if you should prescribe a *Servant*, about a *Sick Person*, (whom you have possessed, that his *Master* shall recover,) when his *Master* is fast asleep, to use such a *Root*, or such a *Root*. For *Imagination* is like to work better upon *Sleeping Men*, than *Men Awake*; As we shall shew when we handle *Dreams*.

956

We find in the *Art of Memory*, that *Images Visible*, work better than other *Conceits*: As if you would remember the *Word Philosophy*, you shall more surely doe it, by *Imagining*, that such a *Man*, (For *Men* are best *Places*) is reading upon *Aristotles Physicks*; than if you should *Imagin* him to say, *I'll goe study Philosophy*. And therefore, this *Observation* would be translated to the *Subject* we now speak of: For the more *Lustrous* the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you shall, in that *Experiment*, (whereof we spake before,) of *Binding of Thoughts*, lesse fail, if you tell *One*, that such an *One* shall name one of *Twenty Men*, than if it were *One of Twenty Cards*. The *Experiment of Binding of Thoughts*, would be *Diversified*, and tried to the *Full*: And you are to note, whether it hit for the most part, though not alwaies.

957

It is good to consider, upon what *Things*, *Imagination* hath most *Force*: And the *Rule*, (as I conceive,) is, that It hath most *Force* upon *Things*, that have the *Lightest* and *Easiest Motions*. And therefore above all, upon the *Spirits of Men*; And in them, upon such *Affections*, as move *Lightest*; As upon *Procuring of Love*; *Binding of Lust*, which is ever with *Imagination*, upon *Men in Fear*; Or *Men in Irresolution*; And the like. Whatsoever is of this kind would be thorowly enquired. *Trials* likewise would be made upon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would *Dye* this year; And will him at these and these times, to go unto it, to see how it thriveth. As for *Inanimate Things*, it is true that the *Motions* of *Shuffling of Cards*, or *Casting of Dice*, are very *Light Motions*: And there is a *Folly* very usefull, that *Gamesters* imagine, that some that stand by them, bring them ill *Luck*. There would be *Triall* also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of holding a *Key* between two *Mens Fingers*, without a *Charm*; And to tell those that hold it that at such *Name*, it shall go off their *Fingers*. For these two are extreme *Light Motions*. And howsoever I have no opinion of these things, yet so much I conceive to be true; That *Strong Imagination* hath more *Force* upon *Things Living*, Or that have been *Living*, than *Things* meerly *Inanimate*: And more *Force* likewise upon *Light*, and *Subtill Motions*, than upon *Motions Vehement*, or *Ponderous*.

958

It is an usual *Observation*, that if the *Body* of *One Murthered*, be brought before the *Murtherer*, the *wounds* will bleed a fresh. Some do affirm, that the *Dead Body*, upon the *Presence* of the *Murtherer*, hath opened the *Eyes*; And that there have been such like *Motions*, as well where the *Partie Murthered* hath been *Strangled*, or *Drowned*, as where they have been *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods Just Judgment*, who usually bringeth *Murders* to *Light*: But if it be *Natural*, it must be referred to *Imagination*.

The Tying of the *Point* upon the day of *Marriage*, to make *Men* impotent towards their *wives*, which (as we have formerly touched,) is so frequent in *Zant*, and *Gascony*, if it bee *Natural*, must be referred to the *Imagination* of *Him* that Tyeih the *Point*. I conceive it to have the lesse *Affinitie* with *witchcraft*, because not *Peculiar* Persons only, (such as *Witches* are,) but any *Bodie* may doe it.

95

There be many *Things*, that work upon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worn, have been antiently and generally Received; and curiously assigned to work severall *Effects*. So much is true; That *Stones* have in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may work by *consent* upon the *Spirits* of *Men*, to *Comfort*, and *Exhilarate* them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Oriental*, and the *Gold-stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no *Credit* to be given to them. But it is manifest, that *Light* above all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Novelty*. And this is one of the *Causes*, why *Precious Stones* comfort. And therefore it were good to have *Tinted Lanthorns*, or *Tinted Skreens*, of *Glasse Coloured* into *Green*, *Blew*, *Carnation*, *Crimson*, *Purple*, &c. And to use them with *Candles* in the *Night*. So likewise to have *Round Glasses*, not only of *Glasse Coloured* iborow, but with *Colours* laid between *Crystals*, with *Handles* to hold in ones *Hand*. *Prisms* are also *Comfortable Things*. They have of *Paris-Work*, *Looking-Glasses*, bordered with broad *Borders* of small *Crystal*, and great *Counterfeit Precious Stones*, of all *Colours*, that are most *Glorious* and *Pleasant* to behold; Especially in the *Night*. The *Pictures* of *Indian Feathers*, are likewise *Comfortable*, and *Pleasant* to behold. So also *Fair* and *Clear Pools* doe greatly comfort the *Eyes* and *Spirits*; Especially when the *Sun* is not *Glaring* but *Overcast*; Or when the *Moon* shineth.

Experiments in Comfort, touching the Secret Virtue of Sympathy and Antipathy.

960

There be divers *Sorts* of *Bracelets* fit to *Comfort* the *Spirits*; And they be of three *Intentions*; *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wish them to be of *Pearl*, or of *Coral*, as is used. And it hath been noted that *Coral*, if the *Party* that weareth it be ill disposed, will wax *Pale*: Which I beleve to be true, because otherwise distemper of *Heat* will make *Coral* lose *Colour*. I commend also *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with some *Cordial Mixture*.

961

For *Corroboration* and *Comfortation*, take such *Bodies* as are of *Astringent Quality*, without *Manifest Cold*. I commend *Bead-Amber*, which is full of *Astringition*, but yet is *Vinctuous*, and not *Cold*; And is conceived to *Impinguate* those that wear such *Beads*: I commend also *Beads* of *Harts-Horn*, and *Ivory*, which are of the like *Nature*; Also *Orenge-Beads*; Also *Beads* of *Lignum Aloes*, *Macerated* first in *Rose-water*, and *Dryed*.

962

For *Opening*, I commend *Beads*, or *Peeces* of the *Roots* of *Carduus Benedictus*: Also of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*.

963

The *Cramp*, (no doubt) commeth of *Contraction* of *Sinews*; Which is manifest in that it commeth either by *Cold*, or *Driness*; As after *Consumptions*, and *Long Agues*; For *Cold* and *Driness* do (both of them) *Contract*, and *Corrugate*: We see also, that *Chafing* a little above the *Place* in pain, easeth the *cramp*; Which is wrought by the *Dilatation*, of the *Contracted Sinews*, by *Heat*. There are in use, for the *Prevention* of the *Cramp*, two *Things*;

964

The

The one *Rings* of *Sea-Horse Teeth*, worn upon the *Fingers*; The other *Bands* of *Green Perewinkle*, (the Herb,) tied about the *Calf* of the *Leg*, or the *Thigh*, &c. where the *Cramp* useth to come. I doe find this the more strange, because Neither of these have any *Relaxing Virtue*, but rather the *Contrary*. I judge therefore, that their *working* is rather upon the *Spirits*, within the *Nerves*, to make them strive lesse, Than upon the *Bodily Substance* of the *Nerves*.

965 I would have *Triall* made of two other *Kinds* of *Bracelets*, for *Comforing* the *Heart*, and *Spirits*; The one of the *Trochisch* of *Vipers*, made into little *Peeces* of *Beads*; For since they doe great Good Inwards, (especially for *Pestilent Agues*;) it is like they will be *Effectual* Outwards; Where they may be applied in greater *Quantity*. There would be *Trochischs* likewise made of *Snakes*; Whose *Flesh* dried, is thought to have a very *Opening*, and *Cordial* *Virtue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the *Principal Ingredient* in their *Cordial Confection* *Alkermes*: The *Beads* would be made up with *Amber-Greece*, and some *Pomander*.

966 It hath been long received, and confirmed by divers *Trials*; That the *Root* of the *Male-Piony*, dried, tied to the *Neck*, doth help the *Falling Sicknesse*; And likewise the *Incubus*, which we call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossnesse* of the *Vapours*, which rise and enter into the *Cells* of the *Brain*: And therefore the *working* is, by *Extreme*, and *Subtil Attenuation*; Which that *Simple* hath. I Judge the like to be in *Castoreum*, *Musk*, *Ren-Seed*, *Agnus Castus Seed*, &c.

967 There is a *Stone*, which they call the *Bloud-Stone*, which worn is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction*, and *Cooling* of the *Spirits*. *Quare*, if the *Stone* taken out of the *Toads Head*, be not of the like *Vertue*; For the *Toad* loveth *Shade*, and *Coolnesse*.

968 *Light* may be taken from the *Experiment* of the *Horse-Tooth Ring*, and the *Garland* of *Periwinkle*, how that those things, which asswage the *Strife* of the *Spirits*, do help diseases, contrary to the *Intention* desired: for in the *Curing* of the *Cramp*, the *Intention* is, to relax the *Sinews*; But the *Contraction* of the *Spirits*, that they strive lesse, is the best *Help*: So to procure easie *Travails* of *Women*, the *Intention* is to bring down the *Child*; But the *Help* is, to stay the *Conning* down too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Fevers*, the *Intention* is to expel the *Infection* by *Sweat*, and *Evaporation*; But the best *Means* to do it, is by *Nitre*, *Dioscorium*, and other *Cool Things*, which doe for a time arrest the *Expulsion*, till *Nature* can do it more quietly. For as one saith prettily; In the *Quenching* of the *Flame* of a *Pestilent Ague*, *Nature* is like *People* that come to *quench* the *Fire* of a *House*; which are so *busie*, as one of them letteth another. Surely, it is an *Excellent Axiome*, and of *Manifold Use*, that whatsoever appeareth the *Contention* of *Spirits*, furthereth their *Action*.

969 The *Writers* of *Natural Magick*, commend the *Wearing* of the *Spoil* of a *Snake*, for *Prserving* of *Health*. I doubt it is but a *Conceit*: For that the *Snake* is thought to renew her *Youth*, by *Castig* her *Spoil*. They might as well take the *Brak* of an *Eagle*, or a *Pece* of a *Harts-Horn*, because those *Renew*.

970 It hath been *Antiently Received*, (For *Pericles* the *Athenian* used it,) and it is yet in use, to wear little *Bladders* of *Quick-Silver*, or *Tablets* of *Arsenick*, as *Preservatives* against the *Plague*: Not as they conceive, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poysons* themselves, they draw the *Venome* to them, from the *Spirits*.

Vide

Vide the Experiments 95, 96, and 97. touching the Several Sympaties, and Antipaties, for Medicinal Use.

971

It is said, that the Guts or Skin of a wolf being applyed to the Belly, doe cure the Cholick. It is true, that the wolf is a Beast of great Edacitie and Digestion; And so it may be, the Parts of him comfort the Bowels.

972

We see Scare-Crowes, are set up to keep Birds from Corn, and Fruit; It is reported by some, that the Head of a wolf, whole, dried and hanged up in a Dove-House, will scare away Vermin; such as are Weasils, Polcats, and the like. It may be, the Head of a Dog will doe as much; For those Vermin with us, know Dogs better than Wolves.

973

The Brains of some Creatures, (when their Heads are roasted) taken in Wine, are said to strengthen the Memory: As the Braines of Hares; Brains of Hens; Brains of Deeres, &c. And it seemeth to be incident to the Brains of those Creatures, that are Fearfull.

974

The Ointment, that Witches use, is reported to be made of the Fat of Children, digged out of their Graves; Of the Iuyces of Smallage, Woolf-Bane, and Cinquesoul; Mingled with the Meal of fine wheat. But I suppose, that the Soporiferous Medicines are likest to do it; which are Henbane, Hemlock, Mandrake, Moon-shade, Tobacco, Opium, Saffron, Poplar-leaves, &c.

975

It is reported by some, that the Affections of Beasts, when they are in Strength, doe adde some Vertue, unto Inanimate Things; As that the Skin of a Sheep, devoured by a wolf, moveth Itching; That a Stone bitten by a Dog in Anger, being thrown at him, drunk in Powder provoketh Choler.

976

It hath been observed, that the Diet of Women with Child, doth worke much upon the Infant; As if the Mother eat Quinces much, and Coriander-Seed, (the Nature of both which is to repress and stay Vapours, that ascend to the Brain,) it will make the Child Ingenious: And on the contrarie side, if the Mother eat (much) Onions or Beans, or such Vapourous Food; Or drink Wine or Strong Drinke, immoderately; Or Fast much; Or be given to much Musing; (All which send, or draw Vapours to the Head,) It indangereth the Child to become Lunaticke, or of imperfect Memory: And I make the same Judgement of Tobacco, often taken by the Mother.

977

The Writers of Naturall Magick report, that the Heart of an Ape worn near the Heart, comforteth the Heart, and increaseth Audacity. It is true, that the Ape is a Merry and Bold Beast. And that the same Heart likewise of an Ape applyed to the Neck, or Head, helpeth the Wit; And is good for the Falling-Sickness: The Ape also is a Witty Beast, and hath a Drie Brain; Which may be some Cause of Attenuation of Vapours in the Head. Yet it is said to move Dreams also. It may be the Heart of a Man would doe more, but that it is more against Mens minds to use it; Except it be in such as wear the Reliques of Saints.

978

The Flesh of a Hedge-Hog, Dressed, and Eaten, is said to be a great Drier: It is true, that the Iuyce of a Hedge-Hog, must needs be Harsh, and Drie, because it putteth forth so many Prickles: For Plants also, that are full of Prickles, are generally Dry: As Briers, Thorns, Barberries: And therefore the Ashes of a Hedge-Hog are said to be a great Dificcative of Fistulaes.

979

Mummy hath great force in Stanching of Blood; which, as it may be ascribed to the Mixture of Balms, that are Glutenous; So it may also partake of a Secret Propriety; In that the Blood draweth Mans Flesh. And it is approved, that the Masse, which groweth upon the Scull of a Dead Man unburied, will stanch Blood Potently. And so doe the Dregs or Powder of Blood, severed from the Water, and Dried.

980

- 981 It hath been practised, to make *White Swallows*, by *Anointing* of the *eggs* with *Oyle*. Which effect may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Juyce*, that putteth forth the *Feathers* afterwards, more *Penurious*. And it may be, the *Anointing* of the *Eggs*, will be as *Effectual*, as the *Anointing* of the *Body*; Of which *Vide* the *Experiment* 93:
- 982 It is reported, that the *white* of an *EGGE*, or *Bloud*, mingled with *Salt-water*, doth gather the *Saltneſſe*, and maketh the *Water* sweeter. This may be by *Adheſion*; as in the 6. *Experiment* of *Clarification*: It may be also, that *Bloud*, and the *White* of an *EGGE*, (which is the *Matter* of a *Living Creature*,) have ſome *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. We ſee that *Salt* laid to a *Cut finger*, healeth it; So as it ſeemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.
- 983 It hath been antiently received, that the *Sea Hare* hath an *Antipathy* with the *Lungs*, (if it commeth neer the *Body*,) and erodeth them. Whereof the *Cauſe* is conceived to be, a *Quality* it hath of *Heating* the *Breath*, and *Spiriſ*; As *Cantharides* have upon the *Watry Parts* of the *Body*; As *Urine* and *Hydropical Water*. And it is a good *Rule*, that whatſoever hath an *Operation* upon certain *Kinds* of *Matters*, that, in *Mans Body*, worketh moſt upon thoſe *Parts*, wherein that kind of *Matter* aboundeth.
- 984 Generally, that which is *Dead* or *Corrupted*, or *Excerned*, hath *Antipathy* with the ſame *Thing*, when it is *Alive*, and when it is *Sound*; And with thoſe *Parts*, which do *Excern*: As a *Carcasse* of *Man* is moſt *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horse*, to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Fleers*, *Carbuncles*, *Pocks*, *Scabs*, *Leproſie*, to *Sound Fleſh*; And the *Excrements* of every *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are leſſe *Pernicious* than the *Corruptions*.
- 985 It is a *Common Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection* ſome *Petty Fellow* is ſent out to kill the *Dogs*; And that though they have never ſeen him before, yet they will all come forth, and bark, and flie at him.
- 986 The *Relations* touching the *Force* of *Imagination*, and the *Secret Inſtinſels* of *Nature*, are ſo uncertain, as they require a great deal of *Examination*, ere we conclude upon them. I would have it firſt thorowly inquired, whether there be any *Secret Paſſages* of *Sympathy* between *Perſons* of *near Blood*; As *Parents*, *Children*, *Brothers*, *Sisters*, *Nurſe-Children*, *Husbands*, *Wives*, &c. There be many reports in *Hiſtorie*, that upon the *Death* of *Perſons* of ſuch *Nearneſſe*, *Men* have had an inward *Feeling* of it. I my *Self* remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dream*, which I told to divers *Engliſh Gentlemen*; that my *Fathers Houſe* in the *Country*, was *Plaiſtered* all over with *Black Mortar*. There is an opinion abroad, (whether idle or no I cannot ſay,) That loving and kind *Husbands* have a *Senſe* of their *Wives* breeding *Child*, by ſome *Accident* in their own *Bodie*.
- 987 Next to thoſe that are *Near* in *Blood*, there may be the like *Paſſage*, and *Inſtinſels* of *Nature*, between great *Friends* and *Enemies*. And ſometimes the *Revealing* is unto Another *Perſon*, and not to the *Party* Himſelf. I remember *Philippus Commineus* (a grave *Writer*,) reporteth; That the *Arch-Biſhop* of *Vienna*, (a *Reverend Prelat*,) ſaid (one day) after *Maſſe*, to *King Lewis* the eleventh of *France*; *Sir, your Mortal Enemy is dead*; What time *Charls Duke* of *Burgundy* was *Slain*, at the *Battel* of *Granson*, againſt the *Switzers*. Some trial alſo would be made, whether *Paſſ* or *Agreement* do any thing; As if two *Friends* ſhould agree, that ſuch a *Day* in every *Week*, they being

being in farre *Distant Places*, should pray one for Another; Or should put on a *Ring* or *Tablet*, one for anothers Sake; Whether if one of them should break their *Vow* and *Promise*, the other should have any feeling of it, in *Absence*.

If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons*; It is Probable the *Force* is much more in the *Joynt Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth, because of the great *Joy*, or *Grief*, that many *Men* are possess'd with at once? *Pius Quintus*, at the very time when that *Memorable Victory* was won, by the *Christians* against the *Turks*, at the *Naval Battel* of *Lepanto*, being then hearing of *Causes* in the *Consistory*, brake off suddenly, and said to those about him, *It is now more than time we should give thanks to God, for the great Victory he hath granted us against the Turks*; It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was meerly his *Work*, to conclude that *League*. It may be, that *Revelation* was *Divine*; But what shall we say then, to a *Number* of *Examples* amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters*, at *Plaies* have had *News* of *Victories*, and *Overthrows*, some few daies, before any *Messenger* could come.

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It is true, that that may hold in these things, which is the generall *Root* of *Superstition*: Namely, that men observe when *Things Hit*, and not when they *Miss*: And commit to *Memory* the one, and forget and passe over the other. But touching *Divination*, and the *Misgiving* of *Minds*, we shall speak more when we handle in generall the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

We having given formerly some *Rules* of *Imagination*; and touching the *Fortifying* of the same. We have set down also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, upon *Beasts*, *Birds*, &c. upon *Plants*, and upon *Inanimate Bodies*: Wherein you must still observe, that your *Trials* be upon *Subtil* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, bind a *Bird* from *Singing*, than from *Eating*, or *Flying*: And I leave it to every *Man* to chuse *Experiments*, which himself thinketh most commodious; Giving now but a few *Examples* of every of the *Three Kinds*.

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Use some *Imaginant*, (observing the *Rules* formerly prescribed) for *Binding* of a *Bird* from *Singing*; And the like of a *Dog* from *Barking*. Try also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cock-Fights*, to make one *Cock* more *Hardy*, and the other more *Cowardly*. It would be tried also in *Flying* of *Hawks*; Or in *Coursing* of a *Deer*, or *Hart*, with *Grey-Hounds*; Or in *Horse-Races*; And the like *Comparative Motions*: For you may sooner by *Imagination*, quicken, or slack a *Motion*, than raise, or cease it; As it is easier to make a *Dog* goe slower, than to make him stand still that he may not run.

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In *Plants* also, you may try the force of *Imagination*, upon the *Lighter* sort of *Motions*: As upon the sudden *Fading*, or *Lively Comming up* of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Closing*, and *Opening*, &c.

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For *Inanimate Things*, you may try the *Force* of *Imagination*, upon *Stay-*

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ing the *working* of Beer, when the Barm is put in ; Or upon the *Comming* of Butter, or Cheese, after the *Cherming*, or the *Rennet* be put in.

993 It is an Antient Tradition, every where alleged, for Example of Secret Proprieties, and Influences, that the *Torpedo Marina*, if it be touched with a long Stick, doth stupifie the Hand of him that toucheth it. It is one degree of Working at Distance, to work by the Continuance of a Fit Medium ; As Sound will be conveyed to the Ear, by striking upon a Bow-string, if the Horn of the Bow be held to the Ear.

994 The Writers of Natural Magick, doe attribute much to the Vertues, that come from the Parts of Living Creatures ; So as they be taken from them, the creatures remaining still alive : As if the creature still living did infuse some Immaterial Vertue, and Vigour into the Part Severed. So much may be true ; that any Part, taken from a Living Creature, newly Slain, may be of greater force than if it were taken from the like creature, dying of itself, because it is fuller of Spirit.

995 Trial would be made, of the like Parts of Individuals, in Plants, and Living creatures ; As to cut off a Stock of a Tree ; And to lay that, which you cut off, to Putrifie, to see whether it will Decay the Rest of the Stock : Or if you should cut off part of the Tail, or Leg of a Dog, or a Cat, and lay it to Putrifie, and to see whether it will Fester, or keep from Healing, the Part which remaineth.

996 It is received, that it helpeth to Continue Love, if one wear a Ring, or a Bracelet of the Hair of the party beloved. But that may bee by the Exciting of the Imagination ; And perhaps a Glove, or other like Favcur, may as well do it.

997 The Sympathy of Individuals, that have been Entire, or have Touched, is of all others the most Incredible : Yet according unto our faithfull Manner of Examination of Nature, we will make some little mention of it. The Taking away of Warts, by Rubbing them with somewhat that afterward is put to waste, and consume, is a common Experiment : And I doe apprehend it the rather, because of mine own Experience. I had from my Childhood, a wart upon one of my Fingers ; Afterwards, when I was about Sixteen years old, being then at Paris, there grew upon both my hands a number of warts (at least an hundred) in a months space ; The English Embassadors Lady, who was a Woman far from Superstition, told me one day, She would help me away with my warts : Whereupon she got a peece of Lard with the Skin on, and rubbed the warts all over with the Fat Side ; and amongst the rest, that wart which I had from my Childhood ; Then she nailed the Peece of Lard, with the Fat towards the Sun, upon a Post of her Chamber Window, which was to the South. The Success was, that within five weeks space, all the warts went quite away : And that wart, which I had so long endured, for Company. But at the rest I did little marvel, because they came in a Short time, and might go away in a Short time again : But the Going of that, which had staid so long, doth yet stick with me. They say the like is done by rubbing of warts with a Green Elder Stick, and then Burying the Stick to Rot in Muck. It would be tried with Corns and Wens, and such other Excrescences ; It would have it also tried, with some parts of Living creatures, that are nearest the Nature of Excrescences ; As the Combs of Cocks, the Spurs of Cocks, the Horns of Beasts, &c. And I would have it tried both waies ; Both by Rubbing those parts with Lard, or Elder, as before ; And by Cutting off some Peece of those Parts, and laying it to Consume. To see whether it will work any Effect, towards the Consumption of that Part, which was once Ioyned with it. It

It is constantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *wound*, will heal the *wound* it self. In this *Experiment*, upon the Relation of *Men of Credit*, (though my self, as yet, am not fully inclined to beleve it,) you shall note the *Points* following; First, the *Ointment*, wherewith this is done, is made of Divers *Ingredients*; whercof the *Strangest* and *hardest* to come by, are the *Mosse* upon the *skull* of a *dear Man*, *Unburied*; And the *Fats* of a *Boar* and a *Bear*, killed in the *Act* of *Generation*. These Two last I could easily suspect to be prescribed as a *Starting Hole*; That if the *Experiment* proved not, it might be pretended, that the *Beasts* were not killed in the due *Time*; For as for the *Mosse*, it is certain there is great *Quantity* of it in *Ireland*, upon *Slain Bodies*, laid on *Heaps*, *Unburied*. The other *Ingredients* are, the *Bloud-Stone* in *Powder*, and some other *Things*, which seem to have a *Virtue* to *Stanch Blood*; As also the *Mosse* hath. And the *Description* of the *whole Ointment* is to be found in the *Chymicall Dispensatory* of *Crollius*. Secondly, the same *Kind* of *Ointment*, applyed to the *Hurt* it self, worketh not the *Effect*; but only applyed to the *Weapon*. Thirdly, (which I like well) they do not observe the *Consecrating* of the *Ointment*, under any certain *Constellation*; which commonly is the *Excuse* of *Magickall Medicines*, when they fail, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may be applyed to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the *Party*, to be *Cured*, is not needfull to *Concurre*; For it may be done without the *Knowledge* of the *Party Wounded*; And thus much hath been tried, that the *Ointment* (for *Experiments* sake,) hath been wiped off the *Weapon*, without the *Knowledge* of the *Party Hurt*, and presently the *Party Hurt*, hath been in great *Rage* of *Pain*, till the *Weapon* was *Reannointed*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *wound*, wherby it bleedeth, the *Anointing* of that *Instrument* will serve, and work the *Effect*. This I doubt should be a *Device*, to keep this strange *Form* of *Cure*, in *Request*, and *Use*. Because many times you cannot come by the *Weapon* it self. Seventhly, the *wound* must be at first *washed Clean*, with *white Wine*, or the *Parties* own *water*; And then bound up close in *Fine Linen*, and no more *Dressing* renewed, till it be *whole*. Eighthly, the *Sword* it self must be *wrapped up Close*, as far as the *Ointment* goeth, that it taketh no *wind*. Ninthly, the *Ointment*, if you wipe it off from the *Sword*, and keep it, will *Serve again*; and rather *Increase* in *Virtue*, than *Diminish*. Tenthly it will *Cure* in far *shorter Time*, than *Ointments* of *wounds* commonly doe. Lastly it will *Cure* a *Beast*, as well as a *Man*; which I like best of all the rest, because it subjecteth the *Matter*, to an *Easie Trial*.

I Would have *Men* know, that though I reprehend, the *Easie Passing over*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Virtues* and *Proprieties*; (For this hath arrested, and laid asleep, all true *Enquiry*, and *Indications*;) yet I do not understand, but that in the *Practical Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, wherunto *Indication* cannot so fully reach: And this is not only in *Specie*, but in *Individuo*. So in *Physick*, if you will cure the *Jaundies*, it is not enough to say, that the *Medicine* must not be *Cooling*; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*; That it must go to the *Gall*; For there is the *Obstruction* with causeth the *Disease*, &c. But you must receive from *Experience*, that *Powder* of *Chamae-*

Experiment
Solitary, touch-
ing Secret
Proprieties.

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pytis, or the like, drunk in *Beer*, is good for the *Jaundies*: So again, a wise *Physician* doth not continue still the same *Medicine* to a *Patient*; But he will vary, if the first *Medicine* doth not apparently succeed: For of those *Remedies*, that are good for the *Jaundies*, *Stone*, *Agues*, &c. that will do good in one *Body*, which will not do good in another; According to the Correspondence the *Medicine* hath to the *Individual Body*.

Experiment
Solitary, touch-
ing the Ge-
neral Sympathy
of Mens Spirit
1000. 5.

THE *Delight* which *Men* have in *Popularity*, *Fame*, *Honour*, *Submission*, and *Subjection* of other *Mens*, *Minds*, *Wills*, or *Affections* (although these *Things* may be desired for other *Ends*) seemeth to be a *Thing*, in it self, without Contemplation of Consequence, Gratefull, and Agreeable to the *Nature* of *Man*. This *Thing* (surely) is not without some Signification, as if all *Spirits* and *Soules* of *Men* came forth out of one *Divine Limbum*; Else why be *Men* so much affected with that, which others think, or say? The best Temper of *Minds* desireth *Good Name*, and *True Honour*: The *Lighter*, *Popularity*, and *Applause*; The more depraved, *Subjection*, and *Tyranny*;

As is seen in *Great Conquerors*, and *Troublers* of the *World*:

And yet more in *Arch-Hereticks*; for the *Introducing* of new *Doctrines*, is likewise an *Affection* of *Tyranny* over the *Vnderstandings*, and *Beliefs* of *Men*.

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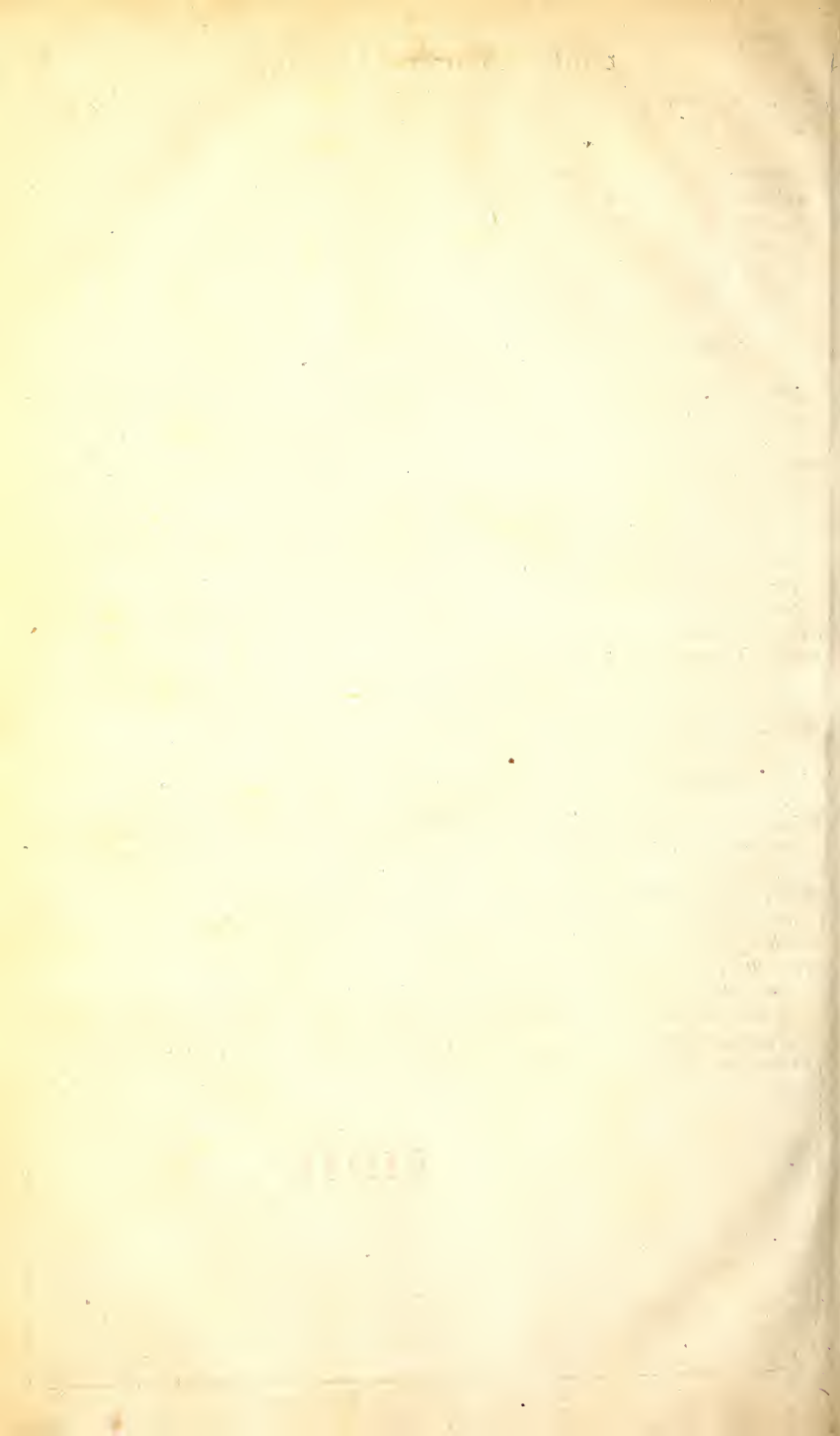
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FINIS.





His Lo^{ps}. Vſual Receipt for the Gout, to which
the Sixtieth Experiment hath reference, was this

To be taken in this Order.

1. The Pultaſſe.

R. Of Mambet, about 3 Ounces, the Cram only, thin cut; Let it be boyled
led in Milk, till it grow to a Pulp. Adde in the end, a Dram, and an
half, of the powder of Red Roſes.

Of Saffron 10 Grains.

Of Oyl of Roſes an Ounce.

Let it be ſpread upon a Linnen Cloth, and applyed luke-warm; And
continued for three Hours ſpace.

2. The Bath, or Fomentation.

R. Of Sage Leaves, half an handfull.

Of the Root of Hemlock, Sliced, 6 Drams.

Of Briony Roots, half an Ounce.

Of the leaves of Red Roſes, 2 Pugills.

Let them be boyled in a pottle of Water, wherein ſteel hath been quenched,
till the Liquor come to a quart. After the Straining, put in half
a handfull of Bay-Salt.

Let it be uſed, with Scarlet Cloth or Scarlet Wool, dipped in the Li-
quor, hot, and ſo renewed ſeven times; All in the ſpace of a quarter
of an Hour, or little more.

3. The Plafter

R. Emplaſtrum Diacalctheos, as much as is ſufficient, for the part you
mean to cover, Let it be diſſolved with Oyl of Roſes, in ſuch a Con-
ſiſtence as will ſtick; And ſpred upon a peece of Holland, and applyed.

1870

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...

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...

...

NEW
ATLANTIS.

A VVork unfinished.

Written by the Right Honourable, FRANCIS,
Lord Verulam, Viscount St. Alban.



NEW
ATLANTIC

A Voyage

Written for the Right Honourable Francis
Earl of Sandwich





To the Reader.



His *Fable* my *Lord* devised, to the end that He might exhibit therein, a *Modell* or *Description* of a *College*, instituted for the *Interpreting* of *Nature*, and the producing of *Great* and *Marvellous Works*, for the *Benefit* of *Men*; Under the Name of *Salomons House*, or the *College of the Six Dayes Works*. And even so farre his *Lordship* hath proceeded, as to finish that Part. Certainly the *Modell* is more *Vast*, and *High*, than can possibly be imitated in all things; Notwithstanding most Things therein are within *Mens Power* to effect. His *Lordship* thought also in this pretent *Fable*, to have composed a *Frame* of *Lawes*, or of the *best State* or *Mould* of a *Common-Wealth*; But foreseeing it would be a long *Work*, his *Desire* of *Collecting* the *Natural History* diverted him, which He preferred many degrees before it.

This *Work* of the *New Atlantis* (as much as concerneth the *English Edition*) his *Lordship* designed for this place; In regard it hath so near *Affinity* (in one part of it) with the preceding *Natural History*.

THE HISTORY OF THE

ROYAL SOCIETY OF LONDON

The first meeting of the Royal Society was held on 28th December 1660, at Gresham College, London. The members of the society were known as the 'Invisible College' and were composed of natural philosophers, mathematicians, and scientists. The society's primary purpose was to advance the understanding of the natural world through observation and experiment.

The society's early work was largely devoted to the study of the natural world, and it was in this field that it made its most significant contributions. The society's members were particularly interested in the study of the natural world, and they were particularly interested in the study of the natural world.

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1660



NEW ATLANTIS.



We sailed from *Pern*, (where we had continued by the space of one whole year) for *China* and *Iapan*, by the South-sea; taking with us Victuals for twelve Months; and had good Winds from the East, though soft and weak, for five Months space and more. But then the wind came about and setled in the West for many daies, so as we could make little or no way, and were sometimes in purpose to turn back: But then again there arose Strong and Great windes from the South, with a Point East; which carried us up, (for all that we could do) towards the North: By which time our Victuals failed us, though we had made good spare of them. So that finding our selves, in the Midst of the greatest VVildernesse of waters in the world, without Victual, we gave our selves for lost Men, and prepared for Death. Yet we did lift up our Hearts and Voices to GOD above, *who sheweth his Wonders in the Deep*; Beseeching him of his Mercy, that as in the *Beginning* He discovered the *Face of the Deep*, and brought forth *Drie-land*: So he would now discover Land to us, that we might not perish. And it came to passe, that the next day about Evening, we saw within a Kenning before us, towards the North, as it were thicker Clouds, which did put us in some hope of Land: Knowing how that part of the South-Sea was utterly unknown; And might have Islands or Continents, that hitherto were not come to light. VVherefore we bent our course thither, where we saw the appearance of Land, all that Night: And in the Dawning of the next Day, we might plainly discern that it was a Land Flat to our sight and full of Boscage: which made it shew the more Dark. And after an Hour and a halfs Sayling, we entered

tred into a good *Haven*, being the Port of a fair *City*, Not great indeed, but well built, and that gave a pleasant view from the Sea. And we thinking every minute long, till we were on Land, came close to the Shore, and offered to Land. But straightwaies we saw divers of the People, with Bastons in their hands, (as it were) forbidding us to land: Yet without any Cries or Fierceneffe, but only as warning us off, by Signes that they made. Whereupon being not a little discomforted, we were advising with our selves, what we should do. During which time, there made forth to us a small Boat, with about eight Persons in it, whereof One of them had in his Hand a Tip-staffe of a yellow Cane, tipped at both ends with Blew, who made aboard our Ship, without any shew of Distrust at all. And when he saw one of our Number, present himself somewhat afore the rest, he drew forth a little Scroul of Parchment (somewhat yellower than our Parchment, and shining like the Leaves of VVriting Tables, but otherwise soft and flexible,) and delivered it to our formost man. In which Scroul were written in Antient *Hebrew*, and in Antient *Greek*, and in good *Latine* of the School, and in *Spanish*, these words; *Land ye not, none of you; and provide to be gone from this Coast, within sixteen daies, except you have further time given you: Mean while, if you want Fresh Water, or Victual, or help for your Sick, or that your Ship needeth repair, write down your wants, and you shall have that which belongeth to Mercy.* This Scroul was signed with a Stamp of *Cherubims Wings*, not spread but hanging downwards; And by them a *Crosse*. This being delivered, the *Officer* returned, and left only a *Servant* with us to receive our Answer. Consulting hereupon amongst our Selves, we were much perplexed. The Deniall of Landing, and Hasty VVarning us away, troubled us much: On the other side, to find that the People had Languages, and were so full of Humanity, did comfort us not a little. And above all, the Sign of the *Crosse* to that Instrument, was to us a great Rejoycing, and as it were a certain Presage of Good. Our Answer was in the *Spanish* tongue, *That for our Ship, it was well; For we had rather met with Calmes and contrary winds, than any Tempests. For our Sick, they were many, and in very ill Case; So that if they were not permitted to Land, they ran in danger of their lives.* Our other VVants wee set down in particular, adding; *That we had some little store of Merchandize, which if it pleased them to deal for, it might supply our Wants, without being chargeable*

able unto them. VVe offered some Reward in Pistolets unto the Servant, and a piece of Crimson Velvet to be presented to the Officer: But the Servant took them not, nor would scarce look upon them: And so left us, and went back in another little Boat which was sent for him.

About three Hours after we had dispatched our Answer, there came toward us, a Person (as it seemed,) of place. He had on him a Gown with wide Sleeves, of a kind of VWater Chamolet, of an excellent Azure Colour, far more glossy than ours: His under Apparell was green, and so was his Hat, being in the form of a Turban, daintily made, and not so huge as the *Turkish* Turbans; And the Locks of his Hair came down below the Brims of it. A Reverend Man was he to behold. He came in a Boat, gilt in some part of it, with four persons more onely in that Boat; And was followed by another Boat, wherein were some Twenty. VVhen he was come within a Flight-shot of our Ship, Signes were made to us, that we should send forth some to meet him upon the water, which we presently did in our Ship-Boat, sending the principal Man amongst us save one, and four of our Number with him. VVhen we were come within six yards of their Boat, they called to us to stay, and not to approach further, which we did. And thereupon the Man, whom I before described, stood up, and with a loud voyce in *Spanish*, asked, *Are ye Christians?* VVe answered, *We weres* fearing the lesse, because of the *Crosse* we had seen in the Subscription. At which Answer the said Person lift up his Right Hand towards Heaven, and drew it softly to his Mouth (which is the Gesture they use, when they thank *God*;) And then said: *If you will swear, (all of you) by the merits of the SAVI-OUR, that ye are no Pirates; Nor have shed blood, lawfully, nor unlawfully, within forty daies past; you may have License to come on Land.* We said, *We were all ready to take that Oath.* VVhereupon one of those that were with him, being (as it seemed) a *No-tary*, made an Entry of this Act. Which done, another of the Attendants of the Great Person, which was with him in the same Boat, after his Lord had spoken a little to him, said aloud: *My Lord would have you know, that it is not of Pride, or Greatnesse, that he commeth not aboard your Ship: But for that, in your Answer, you declare, that you have many Sick amongst you, he was warned by the Conservatour of Health, of the City, that he should keep a distance.* VVe bowed our selves towards him, and answered: *We*

were his humble Servants; And accounted for great Honour, and singular Humanity toward us, that which was already done: But hoped well, that the Nature of the Sicknesse, of our Men, was not infectious. So he returned; And a while after came the Notary to us aboard our Ship; Holding in his hand a Fruit of that Country, like an Orenge, but of colour between Orenge-tawny and Scarlet: which cast a most excellent Odour. He used it (as it seemeth) for a Preservative against Infection. He gave us our Oath; By the Name of Jesus and his Merits; And after told us, that the next day by six of the Clock in the Morning, we should be sent to, and brought to the Strangers House, (so he called it) where we should be accommodated of things, both for our VWhole, and for our Sick. So he left us; And when we offered him some Pistolets, he smiling, said: He must not be twice paid for one Labour. Meaning (as I take it) that he had Salary sufficient of the State for his Service. For (as I after learned) they call an Officer that taketh Rewards, *Twice-paid*.

The next Morning early, there came to us the same Officer, that came to us at first with his Cane, and told us: *He came to conduct us to the Strangers House: And that he had prevented the Hour, because we might have the whole day before us, for our Businesse. For (said he) If you will follow my Advice, there shall first go with me some few of you, and see the place, and how it may be made convenient for you: And then you may send for your Sick, and the rest of your Number, which ye will bring on Land.* VVe thanked him, and said: *That this Care, which he took of desolate Strangers, God would reward.* And so six of us went on Land with him: And when we were on Land, he went before us, and turned to us, and said; *He was but our Servant, and our Guide.* He led us through three fair Streets; And all the VWay we went, there were gathered some People on both sides, standing in a Row: But in so civil a fashion, as if it had been, not to wonder at us, but to welcom us; And divers of them, as we passed by them; put their Armes a little abroad, which is their Gesture, when they bid any welcom. The *Strangers House* is a fair and spacious House, built of Brick, of somewhat a blewer Colour than our Brick: And with handsome VWindows, some of Glasse, some of a kind of Cambrick oyled. He brought us first into a fair Parlour above stairs, and then asked us: *What number of persons we were? And how many sick?* we answered, *We were in all (sick and whole) one and fifty Persons; whereof*

our sick were seventeen. He desired us to have patience a little, and to stay till he came back to us, which was about an Hour after; And then he led us to see the Chambers, which were provided for us, being in number nineteen. They having cast it (as it seemeth) that four of those Chambers, which were better than the rest, might receive four of the principal Men of our Company; And lodge them alone by themselves; And the other fifteen Chambers were to lodge us, two and two together. The Chambers were handsome and chearfull Chambers, and furnished civilly. Then he led us to a long Gallery, like a Dorture, where he shewed us all along the one side (for the other side was but wall and window) seventeen Cells, very neat ones, having partitions of Cedar wood. VVhich Gallery, and Cells, being in all 40. (many more than we needed,) were instituted as an Infirmary for sick Persons. And he told us withall, that as any of our Sick waxed well, he might be removed from his Cell, to a Chamber: For which purpose there were set forth ten spare Chambers, besides the number we spake of before. This done, he brought us back to the Parlour, and lifting up his Cane a little (as they do when they give any Charge or Command) said to us; *Ye are to know that the Custome of the Land requireth, that after this day, and to morrow, (which we give you for removing your People from your Ship,) you are to keep within doores for three daies. But let it not trouble you, nor do not think your selves restrained, but rather left to your Rest and Ease. You shall want nothing; and there are six of our People appointed to attend you, for any Businessse you may have abroad.* We gave him thanks with all Affection and Respect, and said; *G O D surely is manifested in this Land.* VVe offered him also twenty Pistoles; But he smiled, and only said; *What? Twice Paid!* And so he left us. Soon after our Dinner was served in; VVhich was right good Viands, both for Bread and Meat: Better than any Collegiate Diet, that I have known in *Europe.* VVe had also Drink of three sorts, all wholesome and good; wine of the Grape; A Drink of Grain, such as is with us our Ale, but more clear: and a kind of Sider made of a fruit of that Countrey; A wonderfull pleasing and Refreshing Drink: Besides, there were brought in to us, great Store of those Scarlet Oranges, for our Sick, which (they said) were an assured Remedy for sicknesse taken at Sea. There was given us also, a Box of small gray, or whitish Pills, which they wished our Sick should take, one of the Pills,

every night before sleep; which (they said) would hasten their Recovery. The next day, after that our Trouble of Carriage, and Removing of our Men, and Goods out of our Shipp, was somewhat settled and quiet, I thought good to call our Company together; and when they were assembled, said unto them; *My dear Friends, Let us know our selves, and how it standeth with us. We are Men cast on Land, as Jonas was, out of the Whales Belly, when we were as buried in the Deep: And now we are on Land, we are but between Death and Life; For we are beyond, both the Old World and the New; And whether ever we shall see Europe, GOD only knoweth. It is a kind of Miracle hath brought us hither: And it must be little lesse that shall bring us hence. Therefore in regard of our Deliverance past, and our danger present, and to come, let us look up to GOD, and every Man reform his own waies. Besides, we are come here amongst a Christian People, full of Pietie and Humanity: Let us not bring that confusion of face upon our selves, as to shew our vices, or unworthinesse before them. Yet there is more: For they have by Commandement, (though in form of courtesie) Cloystred us within these Walls for three daies: Who knoweth, whether it be not, to take some taste of our manners and conditions? And if they find them bad, to banish us straightwaies; if good, to give us further time. For these men, that they have given us for Attendance, may withall have an Eye upon us. Therefore for Gods love, and as wee love the weal of our Soules and Bodies, let us so behave our selves, as we may be at peace with GOD, and may find grace in the eyes of this People.* Our Company with one voyce thanked me for my good Admonition, and promised me to live soberly and civilly, and without giving any the least occasion of Offence. So we spent our three daies joyfully, and without care, in expectation what would be done with us, when they were expired. During which time, we had every hour joy of the Amendment of our Sick; who thought themselves cast into some Divine Pool of Healing; They mended so kindly, and so fast.

The Morrow after our three daies were past, there came to us a new Man, that we had not seen before, clothed in blew as the former was, save that his Turban was white with a small red Crosse on the Top. He had also a Tippet of fine Linnen. At his Comming in, he did bend to us a little, and put his Arms abroad. We of our parts saluted him in a very lowly and submissive manner; As looking that from him we should receive Sentence of Life, or Death. He desired to speak with some

some few of us; Whereupon six of us only stayed, and the rest avoided the Room. He said; I am by Office Governour of this House of Strangers, and by Vocation I am a Christian Priest; and therefore am come to you, to offer you my service, both as Strangers, and chiefly as Christians. Some things I may tell you, which I think you will not be unwilling to hear. The State hath given you Licence to stay on Land for the space of six weeks: And let it not trouble you, if your occasions ask further time, for the Law in this point is not precise; And I do not doubt, but myself shall be able to obtain for you such further time as shall be convenient. Ye shall also understand, that the Strangers House, is at this time Rich, and much aforehand; For it hath laid up Revenew these 37 years: For so long it is since any Stranger arived in this part: And therefore take ye no care, The State will defray you all the time you stay: Neither shall you stay one day lesse for that. As for any Merchandize you have brought, ye shall be well used, and have your return, either in Merchandize, or in Gold and Silver: For to us it is all one. And if you have any other Request to make, bide it not. For ye shall find, we will not make your countenance to fall, by the answer ye shall receive. Only this I must tell you, that none of you must go above a Karan, (that is with them a mile and an half) from the Walls of the City, without special leave. VVe answered, after we had looked a while upon one another, admiring this gracious and Parent-like usage; That we could not tell what to say: For we wanted words to expresse our Thanks; And his Noble free Offers left us nothing to ask. It seemed to us, that we had before us a Picture of our Salvation in Heaven: For we that were a while since in the Jaws of Death, were now brought into a place, where we found nothing but Consolations. For the Commandment laid upon us, we would not fail to obey it, though it was impossible but our Hearts should be enflamed to tread further upon this happy and Holy Ground. VVe added; That our Tongues should first cleave to the Roofes of our Mouths, ere we should forget, either this Reverend person, or this whole Nation, in our Prayers. VVe also most humbly besought him to accept of us as his true servants, by as just a Right, as ever men on Earth were bounden; laying and presenting, both our Persons, and all we had at his feet. He said; He was a Priest, and looked for a Priests reward; which was our Brotherly love, and the good of our Souls and Bodies. So he went from us, not without Tears of Tendernesse in his Eyes; And left us also confused with joy and kindnesse, saying amongst our selves; That we were come into a Land of Angels;

which did appear to us daily, and prevent us with Comforts, which we thought not of, much less expected.

The next day about ten of the Clock, the Governour came to us again, and after Salutations, said familiarly; *That he was come to visit us; And called for a Chair, and sate him down: And we being some ten of us (the rest were of the meaner sort, or else gone abroad,) sate down with him: And when we were set, he began thus. We of this Island of Bensalem (for so they call it in their Language) have this: That by means of our solitary Situation, and of the Laws of Secrecy, which we have for our Travellers, and our rare Admissim of Strangers; we know well most part of the Habitable World, and are our selves unknown. Therefore because he that knoweth least, is fittest to ask Questions, it is more reason, for the Entertainment of the time, that ye ask me Questions, than that I ask you. VVe answered, That we humbly thanked him, that he would give us leave so to do: And that we conceived by the taste we had a'ready, that there was no worldly thing on Earth, more worthy to be known, than the State of that happy Land. But above all (we said) since that we were met from the several Ends of the world, and hoped assuredly, that we should meet one day in the Kingdom of Heaven (for that we were both Parts Christians) we desired to know (in respect that Land was so remote, and so divided by vast and unknown Seas from the Land where our SAVIOUR walked on Earth) who was the Apostle of that Nation, and how it was converted to the Faith? It appeared in his face, that he took great Contentment in this our Question: He said, Ye knit my heart to you, by asking this Question in the first place: For it sheweth, that you First seek the Kingdom of Heaven: And I shall gladly, and briefly, satisfy your demand.*

About twenty Years after the Ascension of our SAVIOUR, it came to pass, that there was seen by the People of Rensufa, (a City upon the Eastern Coast of our Island, (within night,) the Night was Cloudy and Calm,) as it might be some mile in the Sea, a great Pillar of Light; Not sharp, but in form of a Column, or Cylinder, rising from the Sea, a great way up towards Heaven: and on the top of it was seen a large Crosse of Light, more bright and resplendent than the Body of the Pillar. Upon which so strange a Spectacle, the People of the City gathered apace together upon the Sands, to wonder; And so after put themselves into a number of small Boats to go nearer to this Marvellous sight. But when the Boats were come within (about) sixty yards of the Pillar, they found themselves all bound, and

and could go no further, yet so as they might move to go about, but might not approach nearer: So as the Boats stood all as in a Theater, beholding this Light, as an Heavenly Sign. It so fell out, that there was in one of the Boats, one of the Wise Men, of the Society of Salomons House: which House or College (my good Brethren) is the very Eye of this Kingdome; Who having a while attentively and devoutly viewed, and contemplated this Pillar and Crosse, fell down upon his face: And then raised himself upon his knees, and lifting up his Hands to Heaven, made his Prayers in this manner.

Lord God of Heaven and Earth, thou hast vouchsafed of thy Grace, to those of our Order, to know thy Works of Creation, and true Secrets of them; And to discern (as far as appertaineth to the Generations of Men) between Divine Miracles, Works of Nature, Works of Art, and Impostures, and Illusions of all sorts. I do here acknowledge and testifie before this People, that the Thing we now see before our eyes, is thy Finger, and a true Miracle. And for-as-much, as we learn in our Books, that thou never workest Miracles, but to a Divine and Excellent End, (for the Laws of Nature are thine own Laws, and thou exceedest them not but upon good cause) we most humbly beseech thee, to prosper this great Sign, And to give us the Interpretation and use of it in Mercy; VVhich thou dost in some part secretly promise, by sending it unto us.

When he had made his Prayer, he presently found the Boat he was in, moveable and unbound; whereas all the rest remained still fast; And taking that for an assurance of Leave to approach, he caused the Boat to be soft'y, and with silence rowed towards the Pillar. But ere he came near it, the Pillar and Crosse of Light brake up; and cast it self abroad, as it were into a Firmament of many Starres; which also vanished soon after; and there was nothing left to be seen, but a small Ark, or Chest of Cedar, dry, and not wet at

all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small green Branch of Palm; And when the wise man had taken it with all reverence into his Boat, it opened of it self, and there was found in it a Book, and a Letter; Both written in fine Parchment, and wrapped in Sindons of Linnen. The Book contained all the Canonical Books of the Old and New Testament, according as you have them; (For we know well what the Churches with you receive;) And the Apocalypse it self; And some other Books of the New Testament, which were not at that time written, were neverthelesse in the Book. And for the Letter, it was in these words.

I Bartholomew, a Servant of the Highest, and Apostle of **JESUS CHRIST**, was warned by an Angel that appeared to me, in a vision of Glory, that I should commit this Ark to the fouds of the Sea. Therefore I do testifie and declare, unto that People, where **GOD** shall ordain this Ark to come to Land, that in the same day is come unto them Salvation, and Peace, and Good Will from the Father, and from the **LORD IESUS**.

There was also in both these Writings, as well the Book, as the Letter, wrought a great Miracle, Conform to that of the Apostles, in the Original Gift of Tongues. For there being at that time, in this Land, Hebrews, Perlians, and Indians, besides the Natives, every one read upon the Book, and Letter, as if they had been written in his own Language. And thus was this Land saved from Infidelity; (as the Remain of the Old World was from Water) by an Ark, through the Apostolical and Miraculous Evangelisme of S. Bartholomew. And here he paused, and a Messenger came, and called him forth from us. So this was all that passed in that Conference.

The next Day, the same Governour came again to us, immediately after Dinner, and excused himself, saying; That the Day before he was called from us somewhat abruptly, but now he would make us amends, and spend time with us, if we held his Company and Conference agreeable; VVe answered; That we held it so agreeable and pleasing to us, as we forgot both Dangers past, and

Fears to come, for the time we heard him speak; And that we thought a Hour spent with him, was worth Tears of our former life. He bowed himself a little to us, and after we were set again, he said; Well, the Questions are on your part. One of our Number said, after a little Pause; That there was a Matter, we were no lesse desirous to know, than fearfull to ask, lest we might presume too far. But encouraged by his rare Humanity toward us, (that could scarce think our selves strangers, being his vowed and professed Servants,) we would take the Hardnesse to propound it: Humbly beseeching him, if he thought it not fit to be answered, that he would pardon it, though he rejected it. We said; We well observed those his words, which he formerly spake, That this happy Island, where we now stood, was known to few, and yet knew most of the Nations of the World; which we found to be true, considering they had the Languages of Europe, and knew much of our State and Businesse: And yet we in Europe (notwithstanding all the remote Discoveries, and Navigations of this last Age) never heard any of the least Inkling or Glimpse of this Island. This we found wonderfull strange; for that all Nations have Enterknowledge one of another, either by Voyge into Foreign Parts, or by Strangers that come to them: And though the Traveller into a Foreign Country, doth commonly know more by the Eye, than he that stayed at home can by relation of the Traveller; Yet both waies suffice to make a mutual Knowledge, in some degree, on both parts. But for this Island, we never heard tell of any Ship of theirs, that had been seen to arrive upon any shore of Europe; No, nor of either the East, or West Indies, nor yet of any Ship of any other part of the World, that had made return for them. And yet the Marvell rested not in this. For the Situation of it (as his Lordship said) in the secret Conclave of such a vast Sea might cause it. But then, that they should have Knowledge of the Languages, Books, Affairs, of those that lye such a distance from them, it was a thing we could not tell what to make of; For that it seemed to us a condition and Propriety of Divine Powers and Beings, to be hidden and unseen to others, and yet to have others open, and as in a light to them. At this speech the Governour gave a gracious smile, and said; That we did well to ask pardon for this Question we now asked; For that it imported, as if we thought this Land a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them News, and Intelligence of other Countries. It was answered by us all, in all possible humblenesse, but yet with a Countenance taking Knowledge, that we knew that

he spake it but merrily. That we were apt enough to think, there was somewhat supernatural in this Island, but yet rather as Angelical, than Magical. But to let his Lordship know truly, what it was that made us tender and doub:full to ask this Question, it was not any such conceit, but because we remembred, hee had given a Touch in his former Speech, that this Land had Laws of Secrecy touching Strangers: To this he said; You remember it aright: And therefore in that I shall say to you, I must reserve some particulars, which it is not lawfull for me to reveal; but there will be enough left to give you satisfaction.

You shall understand (that which perhaps you will scarce think creäible) that about three thousand Years ago, or somewhat more, the Navigation of the World (specially for remote Voyages) was greater than at this Day. Do not think with your selves, That I know not how much it is increased with you, w:thin these threescore Years: I know it well; And yet I say, greater then, than now: Whether it was, that the example of the Ark, that saved the Remnant of Men, from the universal Deluge, gave Men confidence to adventure upon the waters; Or what it was; but such is the truth. The Phœnicæans, and specially the Tyrians, had great Fleets. So had the Carthaginians their Colony, which is yet further West. Toward the East the Shipping of Egypt, and of Palestina, was likewise great. China also, and the great Atlantis, (that you call America) which have now but Iunks, and Canoes, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fifteen hundred strong Ships, of great content. Of all this, there is with you sparing Memory, or none; But we have large Knowledge thereof.

At that time, this Land was known and frequented by the Ships and Vessels of all the Nations beforenamed. And (as it commeth to passe) they had many times Men of other Countries, that were no Sayers, that came with them; As Persians, Chaldeans, Arabians; So as almost all Nations of Might and Fame resorted hither; Of whom, we have some Stirps, and little Tribes with us, at this day. And for our own Ships, they went sundry Voyages, as well to your Streights, which you call the Pillars of Hercules, As to other parts in the Atlantique and Mediterrane Seas; As to Paguin, (which is the same with Cambalaine) and Quinzy, upon the Oriental Seas, as far as to the Borders of the East Tartary.

At the same time, and an Age after, or more, the Inhabitants of the great Atlantis did flourish. For though the Narration and Description

scription which is made by a great Man with you, that the Descendents of Neptune planted there; and of the Magnificent Temple, Palace, City, and Hill; and the manifold streams of goodly Navigable Rivers, which (as so many Chains) environed the same Site, and Temple; And the severall Degrees of Ascent, whereby Men did climbe up to the same, as if it had been a Scala Cœli; be all Poeticall and Fabulous: Yet so much is true, that the said Country of Atlantis; Aswell that of Peru then called Coya, as that of Mexico, then named Tyrambel, were mighty and proud Kingdomes, in Arms, Shipping, and Riches: So mighty, as at one time, (or at least within the space of ten years,) they both made two great Expeditions; They of Tyrambel through the Atlantique to the Mediterrane Sea; and they of Coya, through the South Sea upon this our Island: And for the former of these, which was into Europe, the same Author amongst you (as as it seemeth) had some relation from the Ægyptian Priest, whom he citeth. For assuredly, such a thing there was. But whether it were the Antient Athenians, that had the glory of the Repulse, and Resistance of those Forces I can say nothing: But certain it is, there never came back, either Ship, or Man from that Voyage. Neither had that other Voyage of those of Coya upon us, had better fortune, if they had not met with enemies of greater clemency. For the King of this Island, (by name Altabin) a wise Man, and a great Warriour; Knowing well both his own strength, and that of his Enemies; handled the matter so, as he cut off their Land-Forces, from their Ships; and entoyled both their Navy, and their Camp, with a greater power than theirs, both by Sea and Land: And compelled them to render themselves without striking stroke: And after they were at his Mercy, contenting himself only with their Oath, that they should no more bear Arms against him, dismissed them all in safety. But the Divine revenge overtook not long after those proud Enterprises. For within lesse than the space of one Hundred Years, the Great Atlantis was utterly lost and destroyed: Not by a great Earth-quake, as your Man saith; (For that whole Tract is little subject to Earth-quake;) But by a particular Deluge, or Inundation; Those Countries having, at this Day, farre greater Rivers, and farre higher Mountains, to pour down Waters, than any part of the Old World. But it is true, that the same Inundation was not deep; Not past forty foot, in most places, from the Ground; So that although it destroyed Man and Beast generally, yet some few wild Inhabitants of the Wood escaped. Birds also were saved by flying to the High Trees and Woods. For as for Men, although they had

Buildings in many places, higher than the Depth of the Water; Yet that Inundation, though it were shallow, had a long Continuance; whereby they of the Vale, that were not drowned, perished for want of Food, and other things necessary. So as marvell you not at the thin Population of America, nor at the Rudeness and Ignorance of the People; For you must account your Inhabitants of America as a young People; younger a thousand years, at the least, than the rest of the World: For that there was so much time, between the Universal Flood, and their Particular Inundation. For the poor Remnant of Humane Seed, which remained in their Mountains, Peopled the Countrie again slowly, by little and little; And being simple and a savage People (Not like Noah and his Sons, which was the chief Family of the Earth) they were not able to leave Letters, Arts, and Civility to their Posterity; And having likewise in their Mountainous Habitations been used, (in respect of the Extreme Cold of those Regions) to cloath themselves with the Skinnes of Tygers, Beares, and great Hairy Coats, that they have in those Parts; When aser they came down into the Valley, and found the intolerable Heats which are there, and knew no means of lighter Apparell; they were forced to begin the custome of Going Naked, which continueth at this day. Only they take great Prides and delight, in the Feathers of Birds; And this also they took from those their Ancestors of the Mountains, who were invited unto it, by the infinite Flight of Birds, that came up to the high Grounds, while the Waters stood below. So you see, by this main Accident of Time, we lost our Traffique with the Amercians, with whom, of all others, in regard, they lay nearest to us, we had most Commerce. As for the other Parts of the World, it is most manifest, that in the Ages following, (whether, it were in respect of Warres, or by a Natural Revolution of Time,) Navigation did every where greatly decay; And specially, farre Voyages, (the rather by the Use of Gallies, and such Vessels as could hardly brook the Ocean) were altogether left and omitted. So then, that Part of Entercourse, which could be from other Nations, to sayl to us; you see how it hath long since ceased; Except it were by some rare Accident, as this of yours. But now of the Cessation of that other Part of Entercourse, which mought be by our Sayling to other Nations, I must yield you some other Cause. For I cannot say, (if I should say truly,) but our Shipping, for Number, Strength, Mariners, Pylots, and all things that appertain to Navigation, is as great as ever; And there-

therefore why we should sit at home, I shall now give you an account by it self; And it will draw nearer, to give you satisfaction, to your principal Question.

There reigned in this Island, about 1900 years ago, a King, whose memory of all others we most adore; Not superstitiously, but as a Divine Instrument, though a Mortal Man: his Name was Salomona: And we esteem him as the Law-giver of our Nation. This King had a large heart, inscrutable for good; and was wholly bent to make his Kingdom and People Happy. He therefore taking into consideration, how sufficient and substantive this Land was, to maintain it self without any ayd (at all) of the Foreiner; Being 5600 Mile in Circuit, and of rare Fertility of Soyl, in the greatest part thereof; And finding also the Shipping of this Country mought be plentifully set on work, both by Fishing, and by Transportations from Port to Port, and likewise by Sayling unto some small Islands that are not farre from us, and are under the Crown and Laws of this State; And recalling into his Memory, the happy and flourishing Estate, wherein this Land then was; So as it mought be a thousand waies altered to the worse, but scarce any one way to the better; thought nothing wanted to his Noble and Heroical Intentions, but onely (as farre as Humane foresight mought reach) to give perpetuity to that, which was in his time so happily established; therefore amongst his other Fundamental Laws of this Kingdom, he did ordain, the Interdicts and Prohibitions, which we have touching Entrance of Strangers; which at that time (though it was after the Calamity of America) was frequent; Doubting Novelties and Commixture of Manners. It is true, the Like Law, against the admission of Strangers without Licence, is an antient Law, in the Kingdom of China, and yet continued in use. But there it is a poor thing; And hath made them a curious, ignorant, fearfull foolish Nation. But our Law-giver made his Law of another temper. For first, he hath preserved all points of Humanity, in taking Order, and making Provision for the Relief of Strangers distressed; whereof you have tasted. At which Speech (as reason was) we all rose up, and bowed our selves. He went on. That King also still desiring tojoyn Humanity and Policy together; And thinking it against Humanity, to detein Strangers here against their Wills; and against Policy, that they should return, and discover their knowledge of this Estate, hee took this Course: He did ordain, that of the Strangers, that should be permitted to Land, as many (at a'l times) might depart as would; But as many as would stay, should have every good Conditions, and Means to live,

from the State. Wherein he saw so farre, that now in so many Ages since the Prohibition, we have memory, not of one Ship that ever returned, and but of thirteen Persons only, at several times, that chose to return in our Bottoines. What those few that returned, may have reported abroad, I know not. But you must think, Whatsoever they have said, could be taken where they came, but for a Dream. Now for our Travelling from hence into Parts abroad, our Law-giver thought fit, altogether to restrain it. So is it not in China. For the Chineses sail where they will, or can; which sheweth, that their Law of keeping out Strangers, is a Law of Pusillanimity and fear. But this restraint of ours, hath one only Exception, which is admirable; Preserving the Good which commeth by communicating with Strangers, and avoiding the Hurt: And I will now open it to you. And here I shall seem a little to digresse, but you will by and by find it pertinent. Ye shall understand, (my dear friends,) that amongst the Excellent acts of that King, one above all hath the prebeminence. It was the Erektion, and Institution of an Order, or Society, which we call Salomons House; The Noblest Foundation, (as we think,) that ever was upon the Earth: And the Lanthorne of this Kingdome. It is dedicated to the Study of the VVorks and Creatures of GOD. Some think it beareth the Founders Name a little corrupted, as if it should be Solamon's House. But the Records write it, as it is spoken. So as I take it to be denominate of the King of the Hebrews, which is famous with you, and no stranger to us; For we have some Parts of his Works, which with you are lost; Namely that Natural History, which he wrote of all plants, from the Cedar of Libanus, to the Mofse that groweth out of the VVall. And of all things that have Life and Motion. This maketh me think that our King, finding himself to Symbolize, in many things, with that King of the Hebrewes (which lived many years before him) honoured him with the Title of this Foundation. And I am the rather induced to be of this Opinion, for that I find in antient Records, this Order or Society is sometimes called Salomons House; And sometimes the College of the Six Daies VVorks; whereby I am satisfied, That our Excellent King had learned from the Hebrews, That GOD had created the World, and all that therein is, within six Daies; And therefore he instituted that House, for the finding out of the true Nature of all things (whereby GOD mought have the more Glory in the Workmanship of them, and Men the more Fruit in their Use of them,) did give it also that second Name. But now to come to our present purpose, When the King had forbidden, to all his People, Navi-

gation in any Part, that was not under his Crown, he made nevertheless this Ordinance; that every twelve years there should be set forth, out of this Kingdom, two Ships, appointed to several Voyages; that in either of these Ships, there should be a Mission of three of the Fellows, or Brethren of Sa'lmons House; whose Errand was only to give us Knowledge of the Affairs and State of those Countries, to which they were designed; And especially of the Sciences, Arts, Manufactures, and Inventions of all the World; And withall to bring unto us, Books, Instruments, and Paterns; in every kind: That the Ships, after they had landed the Brethren, should return; And that the Brethren should stay abroad till the new Mission. The Ships are not otherwise fraught than with store of Victuals, and good Quantity of Treasure to remain with the Brethren, for the buying of such Things, and rewarding of such Persons, as they should think fit. Now for me to tell you, how the vulgar sort of Mariners are contained from being discovered at Land; And how they that must be put on shore for any time, colour themselves under the Names of other Nations; And to what places these Voyages have been designed; And what places of Rendezvous are appointed for the new Missions; And the like circumstances of the Practique; I may not do it; Neither is it much to your desire. But thus you see we maintain a Trade, not for Gold, Silver, or Jewels; Nor for Silks; Nor for Spices; Nor any other Commodity of Matter; But only for Gods first Creature, which was Light: To have Light (I say) of the growth of all Parts of the World. And when he had said this, he was silent; And so were we all. For indeed we were all astonished, to hear so strange things so probably told. And he perceiving that we were willing to say somewhat, but had it not ready, in great Courtesie took us off, and descended to ask us Questions of our Voyage and Fortunes, and in the end concluded that we mought do well, to think with our selves, what time of stay we would demand of the State; And bad us not to scant our selves: For he would procure such time as we desired. Whereupon we all rose up and presented our selves to kisse the skirt of his Tippet, but he would not suffer us; and so took his leave: But when it came once amongst our People, that the State used to offer Conditions to Strangers, that would stay, we had work enough to get any of our Men to look to our Ship; And to keep them from going presently to the Governor, to crave conditions. But with much ado we refrained them, till we mought agree what course to take.

We took our selves now for freemen, seeing there was no danger of our utter Perdition; And lived most joyfully, going abroad, and seeing what was to be seen, in the City and places adjacent, within our *Tedder*; And obtaining acquaintance with many of the City, not of the meanest Quality; at whose hands we found such Humanity, and such a Freedome and desire to take Strangers, as it were, into their Bosome, as was enough to make us forget all that was dear to us, in our own Countries: And continually we met with many things, right worthy of Observation, and Relation: As indeed, if there be a Mirrour in the World, worthy to hold Mens Eyes, it is that Country. One day there were two of our Company bidden to a *Feast*, of the *Family*, as they call it. A most Natural, Pious, and Reverend Custom it is, shewing that Nation to be compounded of all goodnesse. This is the manner of it. It is granted to any Man, that shall live to see thirty Persons, descended of his Body, alive together, and all above three years old, to make this *Feast*, which is done at the cost of the State. The *Father* of the *Family*, whom they call the *Tirsan*, two daies before the *Feast*, taketh to him three of such Friends as he liketh to chuse; And is assisted also by the Governour of the City, or Place, where the *Feast* is celebrated; and all the *Persons* of the *Family*, of both Sexes, are summoned to attend him. These two daies the *Tirsan* sitteth in consultation, concerning the good Estate of the *Family*. There, if there be any Discord or Sutes between any of the *Family*, they are compounded and appeased. There, if any of the *Family* be distressed or decayed, order is taken for their Relief, and competent means to live. There, if any be subject to vice, or take ill Courses, they are reprov'd, and Censured. So likewise, Direction is given touching Mariages, and the courses of life, which any of them should take, with divers other the like Orders and Advices. The Governour assisteth to the end, to put in Execution, by his Publike Authority, the Decrees and orders of the *Tirsan*, if they should be disobeyed, though that seldome needeth; Such Reverence and obedience they give, to the Order of Nature. The *Tirsan* doth also then ever chuse one man from amongst his Sons, to live in House with him: Who is called, ever after, the *Son of the Vine*. The Reason will hereafter appear. On the *Feast* day, the *Father*, or *Tirsan*, commeth forth after Divine Service into a large Room where the *Feast* is celebrated; Which Room hath an Half-

Pace at the upper end. Against the wall, in the middle of the Half-Pace, is a Chair placed for him, with a Table and Carpet before it: Over the Chair is a State, made Round or Ovall, and it is of Ivy; An Ivy somewhat whiter than ours, like the Leaf of a Silver Aspe, but more shining; For it is green all winter. And the State is curiously wrought with Silver and Silk of divers Colours, broiding or binding in the Ivy; And is ever of the work, of some of the Daughters of the Family; And veiled over at the Top, with a fine Net of Silk and Silver. But the Substance of it is true Ivy; whereof, after it is taken down, the Friends of the Family are desirous to have some Leaf or Sprig to keep. The *Tirfan* commeth forth with all his Generation or Linage, the Males before him, and the Females following him; And if there be a Mother, from whose Body the whole Linage is descended, there is a Traverse placed in a Loft above on the right hand of the Chair, with a privy Dore, and a carved VWindow of Glasse, leaded with Gold and Blew; where she sitteth, but is not seen. VWhen the *Tirfan* is come forth, he sitteth down in the Chair; And all the Linage place themselves against the VWall, both at his Back, and upon the Return of the Half-pace, in Order of their years, without difference of Sex, and stand upon their Feet. VWhen he is set, the Room being alwaies full of Company; but well kept, and without Disorder; after some pause there commeth in from the lower end of the Room, a *Taratan*, (which is much as an *Herald*) And on either side of him two *young Lads*; whereof one carrieth a Scrowl of their shining yellow Parchment; And the other a cluster of Grapes of Gold, with a long foot or Stalk. The *Herald*, and *Children*, are chothed with Mantles of Sea-water green Sattin; But the *Heralds* Mantle is streamed with Gold, and hath a train. Then the *Herald* with three Courtesies, or rather inclinations, commeth up as far as the Half-pace; And there first taketh into his Hand the Scrowl. This Scrowl is the *Kings Charter*, containing Gift of Revenew, and many Privileges, Exemptions and points of Honour, granted to the *Father* of the *Family*; And it is ever stiled and directed, *To such an one, Our well-beloved Friend and Creditour*: Which is a Title proper only to this Case. For they say, the King is Debter to no Man, but for Propagation of his Subjects; the Seal set to the *Kings Charter*, is the Kings Image, Imbossed or moulded in Gold; And though such *Charters* be expedited of Course, and

as of Right, yet they are varied by discretion, according to the Number and Dignity of the *Family*. This *Charter* the *Herald* readeth aloud; And while it is read, the *Father* or *Tirfan*, standeth up, supported by two of his Sons; such as he chooseth. Then the *Herald* mounteth the *Half-Pace*, and delivereth the *Charter* into his Hand: And with that there is an Acclamation, by all that are present, in their Language, which is thus much; *Happy are the People of Bensalem*. Then the *Herald* taketh into his Hand from the other Child, the Clusture of Grapes, which is of Gold; Both the Stalk, and the Grapes. But the Grapes are daintily enamelled; And if the Males of the *Family* be the greater number, the Grapes are enamelled Purple, with a little Sun set on the top; If the Females, then they are enamelled into a greenish yellow, with a Cressant on the top. The Grapes are in number as many as there are Descendants of the *Family*. This Golden Clusture, the *Herald* delivereth also to the *Tirfan*; who presently delivereth it over to that Son, that he had formerly chosen, to be in House with him: VVho beareth it before his *Father*, as an ensign of Honour; when he goeth in Publike ever after; And is thereupon called *the Son of the Vine*. After this Ceremony ended, the *Father* or *Tirfan* retireth; And after some time commeth forth again to Dinner, where he sitteth alone under the State, as before; And none of his Descendants sit with him, of what Degree or Dignity so ever, except he hap to be of *Salomons House*. He is served only by his own Children, such as are Males; who perform unto him all service of the Table upon the Knee; And the VVoemen only stand about him, leaning against the VVall. The Room below his Half-pace, hath tables on the sides for the Guests that are bidden; who are served with great and comely order; And toward the end of Dinner (which in the greatest Feasts with them, lasteth never above an Hour and an half) there is an *Hymn* sung, varied according to the Invention of him that composed it; (for they have excellent Poesie,) But the Subject of it is (alwaies) the praises of *Adam*, and *Noah*, and *Abraham*; VVhereof the former two Peopled the VVorld, and the last was the *Father* of the *Faithfull*: concluding ever with a Thanksgiving for the *Nativity* of our *Saviour*; in whose Birth, the Births of all are only Blessed. Dinner being done, the *Tirfan* retireth again; And having withdrawn himself alone into a place, where he maketh some private Prayers, he commeth forth the third time, to give the Blessing;

sing; with all his Descendants, who stand about him as at the first. Then he calleth them forth by one and by one, by name, as he pleaseth, though seldome the Order of Age be inverted. The person that is called, (the Table being before removed,) kneeleth down before the Chair, and the *Father* layeth his Hand upon his Head, or her Head, and giveth the Blessing in these words; *Son of Bensalem, (or Daughter of Bensalem,) thy Father saith it; The Man by whom thou hast Breath and Life speaketh the word; the blessing of the Everlasting Father, the Prince of Peace, and the Holy Dove be upon thee, and make the daies of thy Pilgrimage good and many.* This he saith to every of them; And that done, if there be any of his Sons of eminent Merit and Vertue, (so they be not above two,) he calleth for them again; and saith, laying his Arm over their Shoulders, they standing; *Sonnes, it is well you are born, give God the praise, and persevere to the end.* And withall delivereth to either of them a Jewell, made in the Figure of an Ear of Wheat, which they ever after wear in the front of their Turban, or Hat. This done, they fall to Musick and dances, and other recreations, after their manner, for the rest of the day. This is the full order of that Feast.

By that time, six or seven daies were spent, I was fallen into straight Acquaintance, with a Merchant of that City, whose Name was *Joabin*. He was a *Jew* and *Circumcised*: For they have some few stirps of *Jews*, yet remaining among them, whom they leave to their own Religion. Which they may the better do, because they are of a farre differing Disposition from the *Jews* in other parts. For whereas they hate the Name of CHRIST; and have a secret inbred Rancour against the People among whom they live; these (contrariwise) give unto our SAVIOUR many high Attributes, and love the Nation of *Bensalem*, extremely. Surely this Man, of whom I speak, would ever acknowledge, that CHRIST was born of a *Virgin*; and that he was more than a Man; And he would tell how GOD made him Ruler of the *Seraphims*, which guard his Throne; And they call him also the *Milken way*, and the *Eliab* of the *Messiah*; and many other high Names; which though they be Inferiour to his Divine Majesty, yet they are far from the Language of other *Jews*. And for the Country of *Bensalem*, this Man would make no end of commending it, Being desirous by Tradition among the *Jews* there, to have it beleeved, that the

People thereof were of the generations of *Abraham*, by another Son, whom they call *Nachoran*; And that *Moses* by a secret *Cabala* ordained the Laws of *Bensalem* which they now use; And that when the *Messia* should come, and sit in his Throne at *Hierusalem*, the King of *Bensalem* should sit at his feet, whereas other Kings should keep a great distance. But yet setting aside these *Jewish* Dreams, the Man was a wise Man, and learned, and of great Policy, and excellently seen in the Laws and Customes of that Nation. Amongst other Discourses, one day I told him, I was much affected with the Relation I had, from some of the Company, of their Custome, in holding the *Feast* of the *Family*; For that (me thought) I had never heard of a Solemnity, wherein Nature did so much preside. And because Propagation of Families, proceedeth from the Nuptial Copulation, I desired to know of him, what Laws and Customes they had concerning Mariage; and whether they kept Mariage well; and whether they were tyed to one Wife? For that where Population is so much affected, and such as with them it seemed to be, there is commonly permission of *Plurality* of *Wives*. To this he said; *You have reason for to commend that excellent Institution of the Feast of the Family; And indeed we have Experience, that those Families that are Partakers of the Blessings of that Feast, do flourish and prosper ever after, in an extraordinary manner. But hear me now, and I will tell you what I know. You shall understand, that there is not under the Heavens so chaste a Nation, as this of Bensalem; Nor so free from all Pollution or foulness. It is the Virgin of the World. I remember, I have read in one of your European Books, of an holy Hermit amongst you, that desired to see the Spirit of Fornication, and there appeared to him, a little foule ugly Æthiope: But if he had desired to see the Spirit of Chastity of Bensalem, it would have appeared to him, in the likeness of a fair beautifull Cherubine. For there is nothing, amongst Mortall Men, more fair and admirable, than the Chaste Minds of this People. Know therefore, that with them there are no Stewes, no dissolute Houses, no Curtisans, nor any thing of that kind. Nay they wonder (with detestation) at you in Europe, which permit such things. They say you have put Mariage out of Office: For Mariage is ordained a Remedy for unlawfull Concupiscence; And Natural Concupiscence seemeth as a spur to Mariage. But when Men have at hand a Remedy, more agreeable to their corrupt Will, Mariage is almost expelled. And therefore there are with you seen*

infinite

infinite Men, that marry not, but chuse rather a libertine and impure single life, than to be yoked in Marriage; And many that do marry, marry late, when the Prime and Strength of their Years is past. And when they do marry, what is Marriage to them, But a very Bargain; Wherein is sought Alliance, or Portion, or Reputation, with some desire (almost indifferent) of Issue; And not the faithfull Nuptial Union of Man and Wife; that was first instituted. Neither is it possible, that those that have cast away so basely, so much of their Strength, should greatly esteem Children (being of the same Matter) as chaste Men do. So likewise during Marriage is the Case much amended, as it ought to be if those things were tolerated only for necessity; No, but they remain still as a very affront to Marriage: The Haunting of those dissolute places, or resort to Courtezans, are no more punished in Married men, than in Batchelers. And the depraved Custom of Change, and the delight in Meretricious Embracements, (where sinne is turned into Art,) maketh Marriage a dull thing, and a kind of Imposition, or Tax. They hear you defend these things; as done to avoid greater Evils; As Advourries, Deflowering of Virgins, Unnatural Lust, and the like: But they say, this is a preposterous Wisdom; and they call it Lots offer, who to save his Guests from abusing, Offered his Daughters: Nay they say further, That there is little gained in this; For that the same Vices and Appetites, do still remain and abound, Unlawfull Lust being like a Furnace, that if you stop the Flames altogether, it will quench, but if you give it any vent, it will rage; As for Masculine love, they have no touch of it; And yet there are not, so faithfull and inviolate Friendships, in the World again, as are there; And to speak generally, (as I said before,) I have not read of any such Chastity, in any People, as theirs. And their usual saying is, That whosoever is unchaste cannot reverence himself: And they say, That the Reverence of a Mans self, is, next Religion, the chiefest bridle of all Vices. And when he had said this, the good Jew paused a little; Whereupon I far more willing to hear him speak on, than to speak my self; yet thinking it decent, that upon his pause of Speech, I should not be altogether silent, said only this; That I would say to him, as the Widow of Sarepta said to Elias; That he was come to bring to Memory our Sinnes; And that I confess the Righteousnesse of Bensalem, was greater than the Righteousnesse of Europe. At which speech he bowed his Head, and went on this manner. They have also many wise and excellent Laws touching Marriage,

They allow no Poligamie. They have ordained that none do intermarry or contract, untill a Month be past from their first interview. Marriage without consent of Parents they do not make void, but they mulct it in the Inheritors: For the Children of such Mariages, are not admitted to inherit, above a third Part of their Parents Inheritance: I have read in a Book of one of your Men, of a Feigned Common-wealth, where the Married couple are permitted, before they Contract, to see one another Naked. This they dislike: for they think it a scorn, to give a Refusal after so familiar Knowledge: But because of many hidden Defects in Men and Womens Bodies, they have a more Civil way: for they have near every Town, a Couple of Pools, (which they call Adam and Eves Pools) where it is permitted to one of the Friends of the Man, and another of the Friends of the Woman, to see them severally bath Naked.

And as we were thus in Conference, there came one that seemed to be a Messenger, in a rich Huke, that spake with the Jew: whereupon he turned to me and said; *You will pardon me, for I am commanded away in haste. The next Morning he came to me again, joyfull, as it seemed, and said; There is word come to the Governor of the City, that one of the Fathers of Salomons House, will be here this day Seven-night: We have seen none of them this Dozen Years: His Comming is in State; But the cause of his Comming is secret. I will provide you, and your Fellows of a good standing to see his Entry. I thanked him and told him: I was most glad of the News. The day being come he made his Entry. He was a Man of middle Stature, and age, comely of person, and had an Aspect as if he pitied Men. He was cloathed in a Robe of fine black Cloath, with wide Sleeves, and a Cape. His under Garment was of excellent white Linnen down to the Foot, girt with a Girdle of the same; And a Sindon or Tippet of the same about his Neck. He had Gloves, that were curious, and set with Stone; And Shoes of Peach-coloured Velvet. His Neck was bare to the Shoulders. His Hat was like a Helmet, or Spanish Montera; and his Locks curled below it decently: They were of Colour brown. His Beard was cut round, and of the same colour with his Hair, somewhat ligher. He was carried in a rich Chariot, without wheeles, Litter-wise, With two Horses at either end, richly trapped in blew Velvet Embroydered; and two Footmen on each side in the like attire. The Chariot was all of Cedar, gilt and adorned with Chrystal; save that the Fore-end had*

Pannels of Sapphires, set in borders of Gold, and the hinder end the like of Emarauds of the *Peru* Colour. There was also a Sun of Gold, Radiant upon the Top, in the Midst; and on the Top before, a small *Cherub* of Gold, with *VVings* displayed. The Chariot was covered with cloth of Gold tissued upon Blew. He had before him fifty attendants, young Men all, in white *Satten* loose Coats up to the Mid Leg, and Stockings of white Silk; and Shoes of blew Velvet; and Hats of blew Velvet; with fine Plums of divers Colours, set round like Hatbands. Next before the Chariot, went two Men, bare headed, in Linnen garments down to the foot, girt, and Shoes of blew Velvet, who carried the one a Crosier, the other a Pastoral Staff like a Sheep-hook; Neither of them of Metal, but the Crosier of Balm-wood, the Pastoral Staff of Cedar. Horsemen he had none, neither before nor behind his Chariot: As it seemeth, to avoid all Tumult and trouble. Behind his Chariot, went all the Officers and Principals of the Companies of the City. He sate alone upon Cushions, of a kind of Excellent Plush, blew; And under his Foot curious Carpets of Silk of divers Colours, like the Persian, but far finer. He held up his Bare Hand as he went, as blessing the people, but in Silence. The Street was wonderfully well kept; So that there was never any Army had their Men stand in better Battel-Array, than the People stood. The *VVindows* likewise was not crouded, but every one stood in them, as if they had been placed. *VVhen* the shew was past, the *Jew* said to me; *I shall not be able to attend you as I would, in regard of some Charge the City hath laid upon me for the Entertaining of this great Person.* Three daies after the *Jew* came to me again and said; *Ye are happy men; For the Father of Salomons House taketh knowledge of your being here, and commanded me to tell you, that he will admit all your Company to his presence, and have private Conference with one of you, that yee shall choose: And for this hath appointed the next day after to Morrow. And because he meaneth to give you his Blessing, he hath appointed it in the Fore-noon.* *VVe* came at our Day and Hour, and I was chosen by my Fellows for the private access. *VVe* found him in a fair Chamber, richly hanged, and carpetted under Foot, without any Degrees to the State, he was set upon a Low Throne richly adorned, and a rich cloth of State over his head of blew *Sattin* Embroidered. He was alone, save that he had two Pages of Honor, on either Hand one, finely attired in

*VV*hite

White. His Under-Garments were the like that we saw him wear in the Chariot; But instead of his Gown, he had on him a Mantle with a Cape, of the same fine Black, fastened about him. When we came in, as we were taught, we bowed Low at our first Entrance; And when we were come near his Chair, he stood up, holding forth his Hand ungloved, and in Posture of Blessing; And we every one of us stooped down, and kissed the Hem of his Tippet. That done, the rest departed, and I remained. Then he warned the Pages forth of the Room, and caused me to sit down beside him, and spake to me thus in the Spanish Tongue.

GOD blesse thee, my Son; I will give thee the greatest Jewel I have. For I will impart unto thee, for the love of GOD and Men, a Relation of the true State of Salomons House. Son, to make you know the true State of Salomons House, I will keep this Order. First, I will set forth unto you the End of our Foundation. Secondly, the Preparations and Instruments we have for our Works. Thirdly, the severall Employments and Functions whereto our Fellows are assigned. And fourthly the Ordinances and Rites which we observe.

The end of our Foundation is the Knowledge of Causes; and Secret Motions of things; and the Enlarging of the bounds of Humane Empire, to the Effecting of all Things possible.

The Preparations and Instruments are these. We have large and deep Caves of several Depths: The deepest are sunk 600 Fathome: And some of them are digged and made under great Hills and Mountains: So that if you reckon together the Depth of the Hill, and the Depth of the Cave, they are (some of them) above three miles deep. For we find, that the Depth of an Hill, and the Depth of a Cave from the Flat, is the same Thing; both remote alike, from the Sun, and Heavens Beams, and from the open Air. These Caves we call the Lower Region. And we use them for all Coagulations, Indurations, Refrigerations, and Conservations of Bodies. We use them likewise for the Imitation of Natural Mines; And the Producing, also of New Artificial Metals, by Compositions and Materials which we use and lay there for many years. We use them also sometimes, (which may seem strange) for Curing of some Diseases, and for Prolongation of Life, in some Hermits that choose to live there, well accommodated of all things necessary, and indeed live very long; by whom also we learn many things.

We have Burials in several Earths, where we put divers Cements

ments, as the Chineses, do their Porcellane. But we have them in greater Variety, and some of them more fine. We also have great variety of Composts, and Soils, for the Making of the Earth Fruitfull.

We have High Towers; The Highest about half a Mile in Height And some of them likewise set upon High Mountains: So that the Vantage of the Hill with the Tower, is in the Highest of them three Miles at least. And these Places we call the Upper Region; A counting the Air between the High Places, and the Low, as a Middle Region. We use these Towers, according to their severall Heights, and Situations, for Insolation, Refrigeration, Conservation, And for the View of divers Meteors; As Winds, Rain, Snow, Hail; And some of the Fiery Meteors also. And upon them, in some Places, are Dwellings of Hermits, whom we visit sometimes, and instruct what to observe.

We have great Lakes, both Salt, and Fresh, whereof we have use for the Fish, and Fowl. We use them also for Burials, of some Natural Bodies: For we find a difference in things buried in Earth, or in Air below the Earth; and things buried in Water. We have also Pools, of which some do strain Fresh Water out of Salt; And others by Art do turn Fresh Water into Salt. We have also some Rocks in the Midst of the Sea; And some Bayes upon the Shore for some Works, wherein is required the Air and Vapour of the Sea. We have likewise violent Streams and Cataracts, which serve us for many Motions: And likewise Engines for Multiplying and Enforcing of Winds, to set also on going divers Motions.

We have also a Number of Artificial Wells and Fountains, made in Imitation of the Natural Sources and Bathes; As tincted upn Vitrioll, Sulphur, Steel, Brasse, Lead, Nitre, and other Minerals: And again, we have little Wells for Infusions of many Things, where the Waters take the Vertue quicker and better, than in Vessels or Basins. And amongst them we have a Water, which we call water of Paradise, being, by that we do it, made very Sovereign for Health and Prolongation of Life.

We have also Great and spacious Houses, where we imitate and demonstrate Meteors; As Snow, Hail, Rain, some Artificial Rains of Bodies, and not of Water, Thunders, Lightnings; Also Generations of Bodies, in Air; As Frogs, Flies, and divers Others.

We have also certain Chambers, which we call Chambers of Health, where we qualifie the Air as we think good and proper for the Cure of divers Diseases, and Preservation of Health.

We have also fair and large Baths, of several Mixtures, for the Cure of Diseases, and the restoring of Mans Body from Arefaction: And other for the Confirming of it in Strength of Sinews, vital Parts, and the very Juyce and Substance of the Body.

We have also large and various Orchards, and Gardens; Wherein we do not so much respect Beauty, as Variety of Ground and Soil, proper for divers Trees and Herbs: And some very spacious, where Trees and Berries are set, whereof we make divers Kinds of Drinks, besides the Vine-yards. In these we practise likewise all Conclusions of Grafting, and Inoculating, as well of Wild-Trees, as Fruit-Trees, which produceth many Effects: And we make (by Art) in the same Orchards, and Gardens, Trees, and Flowers, to come earlier or later than their Seasons; And to come up and bear more speedily than by their Natural Course they do. We make them also by Art greater much than their Nature; And their Fruit greater, and sweeter, and of differings Taste, Smell, Colour, and Figure, from their Nature. And many of them we so Order, that they become of Medicinal Use.

We have also Means to make divers Plants rise, by Mixtures of Earths without Seeds; And likewise to make divers New Plants, differing from the Vulgar; and to make one Tree or Plant turn into another.

We have also Parks, and Enclosures of all Sorts of Beasts, and Birds, which we use not only for View or Rarenesse, but likewise for Dissections and Trials; That thereby we may take light, what may be wrought upon the Body of Man. Wherein we find many strange Effects; As Continuing Life in them, though divers Parts, which you account Vital, be perished, and taken forth; Resuscitating of some that seem Dead in Appearance; And the like. We try also all Poysons, and other Medicines upon them, as well of Chirurgery, as Physick. By Art likewise we make them Greater or Taller, than their Kind is; And contrariwise Dwarf them and stay their Growth: We make them more Fruitfull and Bearing than their Kind is; And contrary-wise Barren and not Generative. Also we make them differ in Colour, Shape, Activity many waies. We find Means to make Commixtures and Copulations of diverse Kinds; which have produced many New Kinds, and them not Barren, as the general Opinion is. We make a number of Kinds of Serpents, Worms, Flies, Fishes, of putrefaction; whereof some are advanced (in effect) to be perfect Creatures, like Beasts, or Birds; And have Sexes, and do propagate. Neither do we this by Chance, but we know before hand, of what Matter and Commixture, what Kind of those Creature will arise.

We have also Particular Pools, where we make Trials upon Fishes, as we have said before of Beasts and Birds.

We have also Places for Breed and Generation of those Kinds of Worms, and Flies, which are of Speciall Use; such as are with you your Silkworms and Bees.

I will not hold you long with recounting of our Brew-houses Bake-houses, and Kitchens, where are made divers Drinks, Breads, and Meats, Rare and of special Effects. Wines we have of Grapes; And Drinks of other Juyce, of Fruits, of Grains, and of Roots; And of Mixtures with Honey, Sugar, Manna, and Fruits dryed and decocted: Also of the Tears or Woundings of Trees; And of the Pulp of Canes. And these Drinks are of Severall Ages, some to the Age or Last of forty years. We have Drinks also brewed with severall Herbs, and Roots, and Spices; Tea, with several Fleshes, and VVhite-Meats; whereof some of the Drinks are such as they are in effect Meat and Drink both: So that Divers, especially in Age, doe desire to live with them, with little or no Meat, or Bread. And above all we strive to have Drinks of Extreme Thin Parts; To insinuate into the Body, and yet without all Biting, Sharpnesse, or Fretting; Insomuch as some of them put upon the Back of your Hand, will, with a little stay passe thorow to the Palme, and yet tast Mild to the Mouth. We have also VVaters, which we ripen in that fashion, as they become Nourishing; So that they are indeed excellent Drink; And many will use no other. Breads we have of Several Grains, Roots, and Kernels; Tea, and some of Flesh, and Fish, Dried; With divers kinds of Leavings, and Seasonings: So that some doe extremely move Appetites; Some doe nourish so, as Divers doe live of them, without any other Meat; Who live very long. So for Meats, we have some of them so beaten, and made Tender, and mortified, yet without all Corrupting, as a VVweak Heat of the Stomack will turn them into good Chilus; As well as a Strong Heat would Meat otherwise prepared. VVe have some Meats also, and Breads, and Drinks, which taken by Men, enable them to Fast long after; and some other, that used make the very Flesh of Mens Bodies, sensibly more Hard and Tough; And their Strength far greater, than otherwise it would be.

VVe have Dispensatories, or Shops of Medicines. VVherein you may easily think, if we have such Varietie of Plants, and Living Creatures, more than you have in Europe, (for we know what you have,) the Simples, Druggs, and Ingredients of Medicines, must likewise be in so much the greater Varietie. VVe have them likewise

of divers Ages, and long Fermentations. And for their Preparations, we have not only all Manner of Exquisite Distillations, and Separations, and especially by Gentle Heats, and Percolations through divers Strainers, yea, and Substances; But also Exact Forms of Composition, whereby they incorporate almost as they were Natural Simples.

We have also divers Mechanical Arts, which you have not; And Stuffs made by them; As Papers, Linnen, Silks, Tissues, dainty Works of Feathers of wonderfull Lustre; excellent Dies, and manie others: And Shops likewise as well for such as are notibrought into Vulgar use amongst us, as for those that are. For you must know, that of the Things before recited, many of them are grown into use throughout the Kingdome; But yet, if they did flow from our Invention, we have of them also for Patterns, and Principals.

We have also Furnaces of great Diversities, and that keep great Diversitie of Heats: Fierce and Quick; Strong and Constant; Soft and Mild; Blown, Quiet Drie, Moist; And the like. But above all we have Heats, in Imitation of the Sunns and Heavenly Bodies Heats, that passe divers inequalities, and (as it were) Orbs, Progresses, and Returns, whereby we may produce admirable effects. Beside, we have Heats of Dung, and of Bellies and Mawes of Living Creatures and of their Bloods, and Bodies; and of Hayes and Herbs laid up moist; of Lime w^h quenched; and such like. Instruments also which generate Heat only by Motion. And further, Places for Strong Insolations; And again, Places under the Earth, which by Nature, or Art yeeld Heat. These divers Heats we use, As the Nature of the Operation which we intend, requireth.

We have also Perspective-Houses, where we make Demonstration of all Lights, and Radiations: And of all Colours: And out of Things uncoloured and Transparent, we can represent unto you all severall Colours; Not in Rain-bows, (as it is in Gemms, and Prisms,) but of themselves Single. We represent also all Multiplications of Light, which we carry to great Distance: and make so Sharp, as to discern small Points and Lines. Also all Colourations of Light. All De'lusions and Deceits of the Sight, in Figures, Magnitudes, M^otions, Colours: All Demontrations of Shadows. Wee find also divers Means yet unknown to you, of Producing of Light, originally, from divers Bodies. We procure means of Seeing Objects A-farr off; As in the Heaven, and Remote places: And rerresent Things Near as A-farr off; And Things A-farr off as Near; Making Feigned Distances. We have also Helps for
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the Sight far above Spectacles and Glasses in use; We have also Glasses and Means to see Small and Minute Bodies, perfectly and distinctly; As the Shapes and Colours of Small Flies and Worms, Grains, and Flaws, in Gemmes, which cannot otherwise be seen, Observations in Urine and Blood not otherwise to be seen: We make Artificial Rain-Bows, Helo's, and Circles about Light. We represent also all manner of Reflexions, Refractions, and Multiplication of Visual Beams of Objects.

We have also Pretious Stones, of all kinds, many of them of great Beauty and to you unknown: Chrystals likewise; And Glasses of divers kinds; And amongst them some of Metals Vittrificated, and other Materials, beside those of which you make Glasse. Also a number of Fossiles, and Imperfect Minerals which you have not. Likewise Loadstones of Prodigious Vertue: And other rare Stones, both Natural and Artificial.

We have also Sound Houses, where we practice and demonstrate all Sounds, and their Generation. We have Harmonies which you have not, of Quarter-Sounds, and lesser Slides of Sounds. Diverse Instruments of Musick likewise to you unknown, some sweeter than any you have, With Bells and Rings that are dainty and sweet. We represent small sounds as great and Deep; Likewise Great sounds, Extenuate and sharp; We make diverse tremblings and VVarblings of Sounds, which in their Original are Entire. We represent and imitate all Articulate sounds and Letters, and the Voices and Notes of Beasts and Birds. We have certain Helps, which set to the Eare do further the Hearing greatly. We have also diverse strange and Artificial Eccho's Reflecting the Voice many times, and as it were tosing it: And some that give back the Voice Lowder than it came, some shriller, and some Deeper; Yea some rendring the Voice, Differing in the Letters or Articulate Sound, from that they receive. We have all means to convey Sounds in Trunks and Pipes, in strange Lines and Distances.

We have also Perfume-houses; wherewith we joyn also Practices of Taste. We Multiply Smells, which may seem strange. We Imitate Smells, making all Smells to breath out of other Mixtures than those that give them. We make diverse Imitations of Taste likewise, so that they will deceive any Mans Taste. And in this House we contain also a Confiture House; where we make all Sweets-Meats Drie and Moist; And divers pleasant Wines, Milks, Broaths, and Sallets, far in greater Variety than you have.

We have also Engine-Houses, where are prepared Engines and

Instruments for all sorts of Motions. There we imitate and practise to make Swifter Motions, than any you have, either out of your Muskets, or any Engine that you have: and to Make them, and Multiply them more Easily, and with Small Force, by Wheels and other Means: and to make them Stronger and more Violent, than yours are; Exceeding your greatest Cannons and Basilisks. We represent also Ordinance and Instruments of War, and Engines of all Kinds: and likewise new Mixtures and Compositions of Gun-Powder, Wild-Fires burning in Water, and Unquenchable: Also Fire-works of all Variety, both for Pleasure, and Use. We imitate also Flights of Birds; We have some Degrees of Flying in the Air. We have Ships and Boats for Going under Water, and Brooking of Seas; Also Swimming-Girdles, and Supporters. We have divers curious Clocks; And other like Motions of Return: And some perpetual Motions. We imitate also Motions of Living Creatures, by Images of Men, Beasts, Birds, Fishes, and Serpents; We have also a great Number of other Various Motions, Strange for Equality, Fineness, and Subtility,

We have also a Mathematical House, where are represented all Instruments, as well of Geometry, as Astronomy, exquisitely made.

We have also Houses of Deceits of the Senses; where we represent all manner of Feats of Jugling, False Apparitions, Impostures, and Illusions; And their Fallacies. And surely you will easily believe that we that have so many Things truly Natural, which induce Admiration, could in a World of Particulars deceive the Senses, if we would disguise those Things, and labour to make them more Miraculous. But we do hate all Impostures, and Lies: Inasmuch as we have severely forbidden it to all our Fellows, under pain of Ignominy and Fines, that they do not shew any Natural Work or Thing, Adorned or Swelling; but only Pure as it is, and without all Affectation of Strangeness.

These are (my Son) the Riches of Salomons House.

For the several Employments and Offices of our Fellows, We have Twelve that Slay into Forcain Countries under the Names of other Nations (for our own we conceal,) Who bring us the Books, and Abstracts, and Patterns of Experiments of all other Parts. These we call Merchants of Light.

We have Three that Collect the Experiments which are in all Books, These we call Depreparators.

We have Three that Collect the Experiments of all Mechanical

cal Arts; And also of Liberal Sciences; And also of practices which are not Brought into Arts. These we call Mystery-men.

We have Three that trie New Experiments.

Such as themselves think good. These we call Pioneers or Miners.

We have Three that Draw the Experiments of the Former Four into Titles and Tables, to give the better light for the drawing of Observations and Axiomes out of them. These we call Compilers.

We have three that bend themselves, Looking into the Experiments of their Fellows, and cast about how to draw out of them Things of Use, and Practice for Mans life, and Knowledge, as well for Works as for Plain Demonstration of Causes, Means of Natural Divinations, and the easie and clear Discovery of the Vertues and Parts of Bodies. These we call Dowry-men or Benefactors.

Then after diverse Meetings and Consults of our whole Number, to consider of the former Labours and Collections, we have three that take care, out of them, to Direct New Experiments, of a Higher Light, more Penetrating into Nature than the Former. These we call Lamps.

We have Three others that do Execute the Experiment, so Directed, and Report them. These we call Inoculators.

Lastly, we have Three that raise the former Discoveries by Experiments, into Greater Observations, Axiomes, and Aporismes. These we call Interpreters of Nature.

We have also, as you must think, Novices and Apprentices, that the Succession of the former Employed men do not fail; besides a great Number of Servants and Attendants, Men, and Women. And this we do also: We have Consultations, which of the Inventions and Experiences, which we have discovered shall be Published, and which not: And take all an Oath of Secrecy, for the concealing of those which we think meet to keep Secret: Though some of those we do reveal sometime to the State, and some not.

For our Ordinances and Rites: We have two very Long, and Fair Galleries: In one of these we place Patterns and Samples of all manner of the more Rare and Excellent Inventions: In the other we place the Statuaes of all Principal Inventours. There we have the Statua of your Columbus, that discovered the West-Indies: Also the Inventour of Ships: Your Monk that was the Inventour of Ordinance, and of Gunpowder: The Inventour of Musick: The Inventour of Letters: The Inventour of Printing: The Inventour of Observations of Astronomy: The Inventour of

VWorks

VVorks in Metall : The Inventour of Glasse : The Inventour of Silk of the VVorm : The Inventour of VVine : The Inventour of Corn and Bread : The Inventour of Sugars : And all these, by more certain Tradition, than you have. Then we have divers Inventours of our Own, of Excellent VVorks ; which since you have not seen, it were too long to make Descriptions of them ; And besides, in the right Understanding of those Descriptions, you might easily erre. For upon every Invention of Value, we erect a Statua to the Inventour, and give him a Liberal and Honourable Reward. These Statuaes are, some of Brals some of Marble and Touchstone ; some of Cedar and other special VVoods gilt and adorned ; some of Iron ; some of Silver ; some of Gold.

We have certain Hymns and Services, which we say daily, of Laud and Thanks to God for his Marvellous VVorks : And Forms of Prayers, imploring his Aide and Blessing for the Illumination of our Labours ; the end turning them into Good and Holy Uses.

Lastly, we have Circuits or Visits, of divers Principal Cities of the Kingdome ; where as it commeth to passe, we do publish such New Profitable Inventions, as we think good. And we do also declare Natural Divinations of Diseases, Plagues, Swarms of Hurtfull Creatures, Scarcity, Tempest, Earthquakes, Great Inundations, Comets, Temperature of the Year, and divers other things ; And we give Counsel thereupon, what the People shall do, for the Prevention and Remedy of them.

And when He had said this, He stood up : And I, as I had been taught, kneeled down : and he laid his Right Hand upon my Head, and said ; GOD blesse thee my Son, and GOD blesse this Relation, which I have made. I give thee leave to Publish it, for the good of other Nations ; For we hear are in GODS Bosome, a Land unknown. And so he left me, Having assigned a value of about two Thousand Duckets, for a Bounty to me and my Fellows. For they give great Largeesses, where they come, upon all occasions.

The rest was not perfected.



MAGNALIA NATVRÆ
PRÆCIPVE QVOAD VSVS
HUMANOS.



He Prologation of Life.

The Restitution of Youth in some Degree.

The Retardation of Age.

The Curing of diseases counted Incurable.

The Mitigation of Pain.

More Easie and less Loathsome Purgings.

The Encreasing of Strength and Activity.

The Encreasing of Ability to suffer Torture or Pain.

The Altering of Complexions : and Fatness, and Leanness.

The Altering of Statures.

The Altering of Features.

The Encreasing and Exalting of the Intellectual Parts.

Version of Bodies into other Bodies.

Making of New Species.

Transplanting of one Species into another.

Instruments of Destruction, as of Warre and Poyson.

Exhilaration of the Spirits, and Putting them in good Disposition.

*Force of the Imagination, either upon another Body,
or upon the Body it self.*

Acceleration of Time in Maturations.

Acceleration of Time in Clarifications.

Acceleration of Putrefaction.

Acceleration of Decoction.

Acceleration of Germination.

Making Rich Composts for the Earth.

Impressions of the Air, and raising of Tempests.

*Great Alteration; As in Induration, Emollition,
&c.*

*Turning Crude and Watry Substances, into Oily
and Vinctuous Substances.*

*Drawing of New Foods out of Substances not now
in Vse.*

*Making New Threds for Apparell; And New
Stuffs, Such as are Paper, Glasse, &c.*

Natural Divinations.

Deceptions of the Senses.

Greater Pleasures of the Senses.

Artificial Minerals and Cements.

FINIS.

HISTORY NATURAL

AND
EXPERIMENTAL,

OF
LIFE and *DEATH.*

OR

Of the Prolongation of Life.

Written in Latine by the Right Honourable
FRANCIS Lord *Verulam*, Vis-Count
Saint *ALBAN*.



L O N D O N,
Printed for *William Lee*, and *Humphrey Moseley*,
and are to be sold at their Shops. 1658.

HISTORY
NATURAL

AND
EXPERIMENTAL

PHILOSOPHY

OF THE PROGRESS OF THE

Written in Latin by the Right Honourable
Baron de Montesquieu



LONDON

Printed for J. and H. Baskin, Stationers, in the Strand, 1755.



TO THE READER.



I Am to give Advertisement, that there came forth, of late, a *Translation* of this *Book*, by an unknowne PERSON, Who though he wished well to the propagating of his *Lordships Works*, yet he was altogether unacquainted with his *Lordships Stile, & Manner of Expressions*; And so published a *Translation*, *Lame*, and *Defective*, in the whole. Whereupon, I thought fit, to recommend the same, to be translated anew, by a more *Diligent*, and *Zealous Pen*; which hath since travailed in it; And though it still comes short of that lively, and incomparable Spirit, and Expression, which lived & dyed with the *Authour*; yet I dare avouch it, to be much more warrantable, and agreeable, than the former. It is true, this *Book* was not intended, to have been published in *English*; But seeing it hath been, already, made free of that *Language*, Whatsoever Benefit, or Delight, may redound from it; I commend the same to the *Courteous*, and *Judicious Reader*. W. R.



To the present Age , and Posterity
Greeting.



Although I had ranked the History of Life and Death, as the last, amongst my six Monethly Designations ; yet I have thought fit , in respect of the prime use thereof ; (In which the least Losse of Time ought to be esteemed precious ; to invert that Order , and to send it forth in the second place. For I have hope, and wish, that it may conduce to a Common Good ; And that the Nobler sort of Physicians will advance their thoughts ; And not employ their Times wholly in the Sordidnesse of Cures ; Neither be Honoured for Necessity only ; But that they will become Coadjutors and Instruments of the Divine omnipotence and Clemencie, in Prolonging and Renewing the Life of Man ; especially seeing I prescribe it to be done by Safe, and Convenient , and Civil wayes, though hiterto un-assayed. For though we Christians doe continually aspire, and pant after the Land of Promise ; Yet it will be a Token of Gods favour towards us , in our Journeyings thorow this Worlds wildernesse , to have our Shooes and Garments, (I meane , those of our Fraile Bodies) little worn, or impaired.

FR. ST. ALBAN.

THE



THE
HISTORY
OF
Life and Death.

The Preface.



It is an ancient Saying, and Complaint; That *Life* is *Short*, and *Art* *Long*. Wherefore, it behoveth us, who make it our chiefest Aime, to perfect *Arts*; to take upon us, the Consideration, of *Prolonging Mans Life*; God the Author of all *Truth*, and *Life*, prospering our Endeavours. For though the *Life* of *Man* be nothing else, but a Masse, and Accumulation of Sins; and Sorrows; And they that look for an *Eternal Lite*, set but light by a *Temporary*; Yet the Continuation of workes of Charity, ought not to be contemned, even by us *Christians*. Besides, the *Beloved Disciple* of our *Lord*, survived the other *Disciples*; And many of the *Fathers* of the *Church*, especially of the *Holy Monkes*, and *Hermits*, were long liv'd; which shewes, that this *Blessing* of *Long Life*, so often promised in the old *Law*, had lesse Abatement after our *Saviours* *Dayes*, than other *Earthly Blessings* had. But to esteem of this, as the chiefest *Good*, we are but too pronc. Onely the *Inquirie* is difficult, how to attain the same; And so much the rather, because it is corrupted with false opinions, and vaine reports. For both; those Things, which the *Vulgar Physicians* talke, of *Radical Moisture*, and *Natural Heat*, are but meer *Fictions*; And the *Immoderate*

The Preface.

rate praises of *Chymical Medicines*; first puffe up with vaine hopes, and then faile then faile their Admirers.

And as for that *Death*, which is caused by Suffocation, Putrefaction, and severall Diseases, we speak not now; For that pertaines to an *History of Physick*; But onely of that *Death*, which comes by a total Decay of the Body, and the In-concoction of old Age. Neverthelesse, the last Act of *Death*, and the very Extinguishing of *Life* it selfe, which may so many wayes be wrought, outwardly, and inwardly; (which notwithstanding have, as it were, one common Porch, before it comes to the point of *Death*;) will be pertinent, to be inquired of in this Treatise; but we reserve that for the last place.

That which may be repaired by degrees, without a total waste of the first stock, is potentially eternal: As the *Vestal Fire*. Therefore, when *Physicians* and *Philosophers* saw, that Living Creatures were nourished, and their Bodies repaired: But that this did last onely for a time; And afterwards came old Age, and, in the end, Dissolution: they sought *Death* in somewhat, which could not properly be repaired; Supposing a *Radical Moisture* incapable of solid Reparation; And which, from the first infancy, received a Spurious Addition, but no true Reparation; whereby it grew daily worse and worse; And, in the end, brought the Bad, to None at all. This conceit of theirs, was both ignorant and vaine. For all Things, in Living Creatures, are, in their youth, repaired entirely; Nay, they are, for a time, increased in Quantity, bettered in Quality; so as the Matter of Reparation might be Eternal, if the Manner of Reparation did not faile. But this is the Truth of it: There is, in the Declining of Age, an unequal Reparation; Some parts are repaired easily, others with Difficulty, and to their losse; So as, from that time, the Bodies of Men begin to endure the Torments of *Mezentius*; *That the Living die in the Embraces of the Dead*; And the Parts easily reparable, through their Conjunction with the Parts hardly reparable, do decay. For the *Spirits*, *Blood*, *Flesh*, and *Fat*, are, even after the Decline of years, easily repaired; But the Drier, and more Porous parts, (As the *Membranes*; All the *Tuicles*; The *Sinewes*, *Arteries*, *Veins*, *Bones*, *Cartilages*; Most of the *Bowels*; In a word, almost all the *Organical Parts*;) are hardly Reparable, and to their losse. Now these hardly Reparable Parts, when they come to their Office, of Repairing the other, which are easily reparable, finding themselves deprived of their wonted Ability, and strength, cease to performe any longer, their proper Functions. By which meanes, it comes to passe, that in processe of time, the whole tends to Dissolution; And even those very parts, which in their owne nature, are, with much ease, Reparable; Yet through the Decay of the Organs of Reparation, can no more receive Reparation; But decline, and, in the end utterly faile. And the cause of the Termination of *Life*, is this; For that the *Spirits*, like a gentle Flame, continually preying upon Bodies; conspiring with the outward *Aire*, which is ever Sucking, and Drying of them; Doe, in time, destroy the whole Fabrick of the Body; As also the particular Engines, and Organs thereof; And make them unable, for the worke, of Reparation. These are the true wayes, of *Natural Death*, well, and faithfully, to be revolved in our Mindes: For He that knowes not the wayes of *Nature*, how can he succour her, or turn her about.

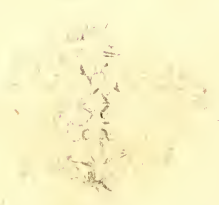
Therefore, the *Inquisition* ought to be two-fold: The one touching the *Consumption*, or *Depredation*, of the Body of Man; The other, touching the

The Preface.

the *Reparation*, and *Renovation* of the same: To the end, that the former may, as much as is possible, be forbidden and restrained; And the Latter, comforted. The Former of these, pertaines especially, to the *Spirits*, and *Outward Aire*; By which the *Depredation*, and *Waste*, is committed; The Latter to the whole Race of *Alimentation*, or *Nourishment*, whereby, the *Renovation* or *Restitution*, is made. And as for the Former part, touching *Consumption*; This hath many Things common, with *Bodies In-animate*, or without *Life*. For such Things, as the *Native Spirit*, (which is in all *Tangible Bodies*, whether living or without *Life*;) And the *Ambient*, or *External Aire*, worketh upon *Bodies In-animate*; The same it attempteth, upon *Animate*, or *Living Bodies*; Although the *Vital Spirit* super-added, doth partly breake, and bridle, those *Operations*: Partly exalt, and advance them wonderfully. For it is most manifest, that *In-animate Bodies*, (most of them,) will endure a long time, without any *Reparation*: But *Bodies Animate*, without *Food*, and *Reparation*, suddenly fall, and are extinguished; As the *Fire* is. So then, our *Inquisition* shall be double; First, we will consider the *Body of Man*, as *In-animate*, and not *Repaired* by *Nourishment*; Secondly, as *Animate*, and *Repaired* by *Nourishment*. Thus having prefaced these things, we come now to the *Tropick Places* of *Inquisition*.



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THE PARTICULAR Tropick Places.

O R, Articles of Inquisition, Touching Life, and Death.



First inquire, of *Nature Durable*, and *Not Durable*; In Bodies *Inanimate*, or without *Life*; As also in *Vegetables*: But that; not in a large, or Just Treatise; But, as in a Brief, or Summary, onely.

Also inquire diligently, of *Desiccation*, *Arefaction*, and *Consumption*, of Bodies *Inanimate*; And of *Vegetables*; And of the wayes, and Processes; by which they are done; And further of *Inhibiting*, and *Delaying*, of *Desiccation*, *Arefaction*, and *Consumption*; And of the *Conservation* of Bodies in their proper State: And againe, of the *Inteneration*, *Emolition*, and *Recovery* of Bodies to their former Freshnesse, after they be once dried and withered,

Neither need the Inquisition, Touching these Things; to be full or exact; seeing they pertain rather, to their proper Title, of *Nature Durable*; seeing also, they are not *Principals*, in this Inquisition; But serve onely, to give Light, to the Prolongation, and Intauraation of *Life*, in *Living Creatures*. In which, (as was said before,) the same Things come to pass, but in a *Particular manner*. So from the Inquisition touching Bodies *Inanimate*, and *Vegetables*; Let the Inquisition passe on to other *Living Creatures*, besides *Man*.

Inquire, touching the *Length*, and *Shortnesse of Life*, in *Living Creatures*; with the due Circumstances, which make most, for their long or *Short Lives*.

But because the *Duration of Bodies*, is two-fold; One in *Identity*, or the selfe-same substance; The other, by a *Renovation*, or *Reparation*; whereof the former, hath place onely, in Bodies *Inanimate*; The Latter in *Vegetables*, and *Living Creatures*; And is perfected by *Alimentation*, or *Nourishment*; Therefore it will be fit to inquire of *Alimentation*; And of the wayes, and *Progresses* thereof: yet this, not exactly; (because it pertaines properly to the *Tules of Assimilation* and *Alimentation*;) But as the rest, in *Progress* onely.

From the Inquisition, touching *Living creatures*, & *Bodies repaired by Nourishment*, passe on to the *Inquisition touching Man*. And now being come to the *principal Subject of Inquisition*, the Inquisition ought to be, in all points, more precise, & accurate. Inquire, touching the *Length*, and *Shortnesse of Life*, in *Men*, according to the *Ages of the world*, The several *Regions*, *Climates*, and *Places*, of their *Nativity* & *Habitacion*.

Inquire, touching the *Length*, and *Shortnesse of Life*, in *Men*, according to their *Races*, and *Families*; As if it were a Thing *Hereditary*: Also according to their *Complexions*, *Constitutions*, and *Habitus* of *Body*; Their *Statures*; The *Manner*, and *Time*, of their *Growth*; And the *Making*, and *Composition*, of their *Members*.

Inquire, touching the *Length*, and *Shortnesse*, of *Life*, in *Men*, according to the *Times* of their *Nativity*; But so, as you omit, for the present, all *Astrological Observations*, and the *Figures* of *Heaven*, under which they were born: Onely insist upon the vulgar, and manifest *Observations*; As whether they were born, in the *Seventh*, *Eighth*, *Ninth*, or *Tenth Moneth*; Also, whether by *Night*, or by *Day*; And in what *Moneth of the Year*?

1

2

3

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8

Inquire, touching the *Length*, and *Shortnesse*, of *Life*, in *Men*, according to their *Fare*, *Diet*, *Government* of their *Life*, *Exercises*, and the like. For as for the *Aire*, in which Men live, and make their *Abode*, we account that proper to be inquired of, in the above-said *Article*, touching the *Places* of their *Habitation*.

9

Inquire, touching the *Length*, and *Shortnesse* of *Life*, in *Men*, according to their *Studies*; Their several *Courses* of *Life*; The *Affections* of the *Minde*; And divers *Accidents* befalling them.

10

Inquire apart, touching those *Medicines*, which are thought to prolong *Life*.

11

Inquire, touching the *Signes*, and *Prognosticks*, of *Long* and *Short* *Life*; Not those which betoken *Death*, at hand; (for they belong to an *History* of *Physick*;) But those, which are seen, and may be observed, even in *Health*; whether they be *Physiognomical* signes, or any other.

Hitherto have been propounded Inquisitions touching Length and Shortnesse of Life, besides the Rules of Art, and in a confused manner; Now we think to adde some, which shall be more Artlike, And tending to Practise, under the name of Intentions. Those Intentions are generally, three: As for the particular Distributions of them, we will propound them, when we come to the Inquisition it selfe. The three general Intentions are, The Forbidding of Waste and Consumption; The Perfecting of Reparation; And the Renewing of Oldnesse.

12

Inquire, touching those things, which *Conserve* and *Exempt* the body of man, from *Arefaction* and *Consumption*; At least, which put off, and protract the inclination thereunto.

13

Inquire, touching those things which pertain to the whole *Processe* of *Alimentation*; (By which the *Body* of man is repaired;) that it may be good, and with the best improvement.

14

Inquire, touching those things which *purge* out the old *Matter*, and *supply* with *New*: As also, which doe *Intenerate*, and *Moisten* those parts, which are already dried, and hardened.

But because it will be hard to know the wayes of Death, unless you search out and discover, the Seat, or Houe, or rather, Den of Death; It will be convenient to make Inquisition of this Thing; yet not of every kind of Death, but of those Deaths which are caused, by want, and Indigence of Nourishment, not by violence: For they are those Deaths only, which pertain to a Decay of Nature, and meer old Age.

15

Inquire, touching the *point* of *Death*; and the *porches* of *Death* leading thereunto from all parts: so as that *Death* be caused, by a *Decay* of *Nature*, and not by *violence*.

Lastly; Because it is behovefull to know the Character and Form of Old-Age; which, will then best be done, if you make a Collection of all the Differences, both in the State, and Functions of the Body, betwixt Youth and Old-Age; That by them you may observe, what it is that produceth such manifold Effects; let not this Inquisition be omitted.

16

Inquire diligently, touching the *Differences*, in the *State* of the *Body*, and *Faculties* of the *Mind*, in *Youth* and *Old-Age*; And whether there be any that remaine the same without *Alteration*, or *Abatement*, in *Old-Age*.

17



Nature Durable, and Not Durable.

The History.

To the first
Artis.



M *Etals*, are of that long lasting, that Men cannot trace the Beginnings of them. And when they doe decay, they decay through *Rust*, not through *Perpiration* into *Aire*. Yet *Gold* decayes neither way.

2

Quick-silver, though it be an *Humide* and *Fluide* *Body*; And easily made *volatile* by *Fire*; yet (as far as we have observed) by *Age* alone, without *Fire*, it neither wasteth, nor gathereth *Rust*.

3

Stones, especially the harder sort of them, and many other *Fossiles*, are of long last-
ing.

ing; And that, though they be exposed to the open Aire; Much more, if they be buried in the Earth. Notwithstanding *Stones* gather a kind of *Nitre*; which is to them, in stead of *Rust*. *Precious Stones*, and *Chrystals*, exceed *Metals* in long Lasting; But then, they grow dimmer, and lesse Orient, if they be very old.

It is observed, that *Stones*, lying towards the North, doe sooner decay with Age, than those that lie towards the South; And that appears manifestly, in *Pyramides*, and *Churches*, and other ancient *Buildings*: Contrariwise, in *Iron*, that exposed to the South, gathers *Rust* sooner; And that to the North, latter; As may be seen, in the *Iron Bars* of windowes. And no marvell, seeing in all Putrefaction, (as *Rust* is) Moisture hastens Dissolutions; In all simple Arefaction, Drienesse.

In *Vegetables*, (we speak of such as are feld, not growing.) the Stocks or Bodies of harder *Trees*, and the Timber made of them, last divers Ages: But then, there is difference, in the Bodies of *Trees*; Some *Trees* are, in a manner, Spongie; as the *Elder*; In which the pith in the midst is soft, and the outward part harder; But in timber-trees, as the *Oke*, the inner part (which they call, *Heart of Oke*) lasteth longer.

The *Leaves*, and *Flowers*, and *Stalkes*, of *Plants*, are but of short lasting; But dissolve into Dust, unlesse they putrifie: the roots are more durable.

The *Bones* of living Creatures last long; as we may see it of Mens bones, in Charnel Houies, *Hornes* also last very long; so doe *Teeth*; as it is seen in *Ivory*, and the *Sea-horse* Teeth.

Hides, also, and *Skins*, endure very long; as is evident in old *Parchment Bookes*: *Paper* likewise, will last many Ages, though not so long as *Parchment*.

Such *Things* as have passed the *Fire*, last long; as *Glass*, and *Bricks*. Likewise, *Flesh*, and *Fruits*, that have passed the fire, last longer than *Raw*: And that not onely, because the baking in the Fire, forbids putrefaction: But also, because the watry Humor being drawn forth, the oily Humor supports it selfe the longer.

Water, of all Liquours is soonest drunk up by *aire*; Contrariwise *Oyle* latest: which we may see, not onely in the *Liquours* them selves; but in the *Liquours* mixt with other Bodies: Eor *Paper* wet with water, and so getting some Degree of Transparency, will soon after wax white, and lose the Transparency again, the watry vapour exhaling, But oiled *Paper* will keep the Transparency long, the *Oile* not being apt to exhale: And therefore they that counterfeit Mens Hands, will lay the oiled paper upon the writing they mean to counterfeit; and then assay to draw the lines.

Gummes, all of them, last very long; The like do *Wax* and *Honey*.

But the *Equal*, or *Un-equal* use of Things, conduceth no lesse to long lasting, or short lasting, than the things themselves. For *Timber* and *Stones*, and other *Bodies*, standing continually in the *water*, or continually in the *aire*, last longer, than if they were sometimes wet, sometimes dry. And so *Stones* continue longer, if they be laid towards the same coast of Heaven, in the Building, that they lay in the Mine. The same is, of *Plants* removed, if they be coasted just as they were before.

Observations.

Let this be laid for a Foundation, which is most sure; That there is, in every Tangible body, a Spirit, or body Pneumatical, enclosed and covered with the Tangible parts; And that from this Spirit, is the beginning of all Dissolution and Consumption; so as the Antidote against them is the Detaining of this Spirit.

This Spirit is detained two wayes; Either by a straight Inclosure, as it were in a Prison; Or by a kind of Free and Voluntary Detention. Again, this voluntary stay is persuaded two wayes: Either if the Spirit it selfe be not too Moveable, or Eager to depart; Or if the external Aire importune it not too much to come forth. So then, two sorts of substances are Durable; Hard Substance, and Oily: Hard Substance binds in the Spirits close; Oily, partly enticeth the Spirit to stay; partly, is of that nature, that it is not importuned by Aire: For Aire is Consubstantial to Water, & Flame to Oile. And touching Nature Durable, & Not Durable, in Bodies inanimate, thus much.

The History.

Herbs, of the Colder sort, die yearly, both in Root and Stalk; As *Lettice*, *Purslane*; Also *wheat*, and all kind of *Corn*. Yet there are some cold Herbs, which will last

three or four years, As the *Violet*, *Straw-bery*, *Burnet*, *Prime-rose*, and *Sorrel*. But *Borage* and *Buglosse*, which seem so alike, when they are alive, differ in their Deaths; For *Borage* will last but one year, *Buglosse* will last more.

14 But many *hot Herbs*, beare their age and yeares better; *Hysop*, *Thyme*, *Savourie*, *Pot-Marjoran*, *Balm*, *Worm-wood*, *Germander*, *Sage*, and the like. *Fennel* dies yearly in the stalk, buds again from the root. But *Pulse* and *sweet Marjoram*, can better endure age than Winter; For being set in a very warm place, and well fenced, they will live more than one year. It is known, that a knot of *Hysop* twice a year shorne, hath continued forty years.

15 *Bushes* and *Shrubs*, live threescore years, and some double as much. A *Vine* may attain to threescore years, and continue fruitfull in the old age. *Rose-mary* well placed will come also to threescore years. But *white Thorn*, and *Ivie*, endure above an hundred yeares. As for the *Bramble*, the age thereof is not certainly known; because bowing the head to the ground, it gets new roots; so as you cannot distinguish the Old, from the New,

16 Amongst great *Trees*, the longest livers are; The *Oke*, the *Holme*, the *Wild-Ash*, the *Elme*, the *Beech-tree*, the *Chest-nut*, the *Plain-tree*, *Ficus Ruminalis*, the *Lot-tree*, the *wilde-Olive*, the *Palme-tree*, and the *Mulbery-tree*: Of these some have come to the Age of eight hundred yeares; but the least livers of them do attain to two hundred.

17 But *Trees Odorate*, or that have sweet woods; and *Trees Rozennie*, last longer in their Woods or Timber, than those above-said, but they are not so long liv'd; as the *Cypress-tree*, *Maple*, *Pine*, *Box*, *Juniper*. The *Cedar* being born out by the vastness of his body, lives well-near as long as the former.

18 The *Ash*, fertile, and forward in bearing, reacheth to an hundred years, and somewhat better; which also the *Birch*, *Maple*, and *Service-tree* sometimes doe: but the *Poplar*, *Lime-tree*, *Willow*, and that which they call the *Sycamore*, and *Walnut-tree*, live, not so long.

19 The *Apple-tree*, *Pear-tree*, *Plum-tree*, *Pamegranate-tree*, *Citron-tree*, *Medlar-tree*, *Black-cherry-tree*, *Cherry-tree*, may attain to fifty or sixty years; especially if they be cleanted from the mosse wherewith some of them are clothed.

20 Generally, greatness of bodie in trees, if other things be equal, hath some congruity with length of life; So hath hardness of substance: And trees bearing *Mast*, or *Nuts*, are commonly longer livers than trees bearing fruit or berries: Likewise, trees putting forth their leaves late, and shedding them late again, live longer than those that are early either in leaves or fruit. The like is of *Wild-trees*, in comparison of *Orchard-trees*: And lastly, in the same kinde, trees that beare a *sowre-fruit*, out-live those that beare a *sweet fruit*.

An Observation.

1 Aristotle noted well the difference between Plants and living Creatures, in respect of their Nourishment and Reparation; Namely, that the Bodies of Living Creatures are confined within certaine Bounds, and that after they be come to their full Growth, they are continued and preserved by Nourishment, but they put forth nothing New, except Haire and Nails; which are counted for no better than Excrements; so as the juice of living Creatures, must, of necessity, sooner wax old: but in trees, which put forth yearly new Boughes, new Shoots, new Leaves, and new Fruits; It comes to passe, that all these parts in Trees are once a year young and renewed. Now, it being so, that what soever is fresh and young, drawes the Nourishment more lively, and cheerfully to it, than that which is decayed and old: It happens withal, that the Stock and Body of the Tree, through which the Sap passeth to the Branches, is refreshed and cheered, with a more bountiful and vigorous Nourishment in the passage, than otherwise it would have been. And this appears manifest (though Aristotle noted it not; Neither hath he expressed these things so clearly and perspicuously.) In Hedges, Copses, and Pollards, when the plashing, shedding, or lopping, comforteth the old Stemme, or Stock, and maketh it more flourishing, and longer liv'd.

Desiccation, prohibiting of Desiccation: and In-teneration of that which is desiccated and dried.

The History.



Fire and strong Heats dry some things, and melt others.

Limus ut hic aurescit, & hæc ut Cera liquefcit, Uno eodemque Igne.

How this Clay is hardened, and how this Wax is melted, with one and the same thing, Fire; It dryeth Earth, Stones, Wood, Cloth, and Skins, & whatsoever is not Liquefiable; and it melteth Metals, Wax, Gums, Butter, Tallow, and the like.

Notwithstanding, even in those things, which the Fire melteth, if it be very vehement and continueth, it doth at last dry them. For Metal in a strong Fire (Gold only excepted) the volatile part being gone forth, will become lesse ponderous, and more brittle: and those Oily, and fat Substances, in the like Fire, will burne up, and be dried, and parched.

Aire, especially open Aire, doth manifestly dry, but not melt: as High-waves, and the upper part of the Earth, moistned with showers, are dried; linnen Clothes, washed, if they be hanged out in the Aire, are likewise dried; Herbs, and Leaves, and Flowers, laid forth in the shade, are dried. But much more suddenly doth the Air this; If it be either inlightned with the Sun-beams (so that they cause not putrefaction.) Or if the Aire be stirred; as when the Winde bloweth; Or in Roomes open, in all sides.

Age most of all, but yet slowest of all, drieth; as in all bodies, which (if they be not prevented by putrefaction) are dry with Age. But Age is nothing of it selfe; being onely the measure of time: That which causeth the Effect, is the native Spirit of bodies, which sucketh up the moisture of the body, and then, together with it; flyeth forth; and the Aire ambient, which multiplieth it selfe, upon the native spirits, and juices of the body, and preyeth upon them.

Cold, of all things, most properly, drieth, for Drying is not caused, but by Contraction; Now Contraction is the proper worke of Cold. But because we Men have Heat in a high Degree, namely that of Fire; but Cold in a very low degree, no other than that of Winter; Or perhaps of Ice, or of Snow, or of Nitre: therefore the Drying caused by Cold, is but weak, and easily resolved. Notwithstanding we see the Surface of the Earth, to be more dried by Frost, or by March winds, than by the Sunne; seeing the same wind, both licketh up the moisture, and affecteth with Coldnesse.

Smoke is a Dryer; as in Bacon, and Neates tongues, which are hanged up in chimneys: & perfumes of Olbanum, or Lignum Aloes, & the like, dry the Brain, and cure Catarrhs. Salt, after some reasonable continuance, dryeth; not only on the out-side, but in the in-side also; as in Flesh and Fish salted, which if they have continued any long time, have a manifest hardnesse within.

Hot Gummes, applied to the skin, dry, and wrinkle it: and some Astringent waters, also doe the same.

Spirit of strong wines, imitateth the Fire in Drying: For it will both potch an Egge, put into it; and toast Bread.

Powders dry like Sponges, by Drinking up the Moisture, as it is in Sand, throwne upon Lines, new written. Also Smoothnesse, and Politenesse, of Bodies (which suffer not the Vapour of Moisture, to goe in by the Pores,) Drie by accident; because it exposeth it to the Aire; As it is seen in Precious Stones, Looking-Glasses, and Blades of Swords; Upon which if you breath, you shall see at first a little Mist; But soon after it vanisheth, like a Cloud. And thus much for Desiccation, or Drying.

They use at this day, in the East parts of Germany, Garners, in Vaultis under Ground: where in they keep Wheat and other Grains; Laying a good quantity of Straw, both under the Grains, and about them, to save them from the Danknes of the Vault: By which device they keep their Grains 20 or 30 years. And this doth not only preserve them from Fustinesse, but (that which pertaines more to the present Inquisition) preserves them also in that Greenesse, that they are fit, and serviceable to make Bread. The same is reported, to have been in use, in Cappadocia, and Thracia, and some parts of Spain.

The placing of Garners, on the Tops of Houses, with Windowes towards the East, and North, is very commodious. Some also make two Sollars; An Upper, and a Lower. And the upper Sollar hath an hole in it; thorow which the Graine continually descendeth, like Sand in an Hour-glasse; And after a few dayes, they throw it up againe with Shovels: That so it may be in continual Motion. Now it is to be noted,

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that this doth not only prevent the Fustiness, but conserveth the greenness, & slacketh the Desiccation of it: The cause is that which we noted before; That the Discharging of the watry *humor*, which is quickned by the *Motion* & the *winds*, preserves the *Oily Humour* in his Being; which other wise would fly cut, together with the *Watry Humour*. Also in some Mounains, where the *Aire* is very pure, *Dead Carcases* may be kept for a good while, without any great Decay.

13 *Fruits*, As *Pomegranates*, *Cyrons*, *Apples*, *Pears*, and the like. Also *Flower*; As *Roses* and *Lilies*; may be kept, a long time, in Earthen Vessels, close stopped. Howsoever they are not free from the Injuries of the outward *Aire*, which will affect them, with his unequal Temper, thorough the sides of the vessel; As it is manifest, in Heat and cold. Therefore it will be good to stop the Mouthes of the vessels carefully, and to bury them within the *Earth*, And it will be as good; Not to bury them in the *Earth*, but to sink them in the *Water*, so as the place be shady; As in *Wells*; Or *Cisterns* placed within Dores: But those that be sunk in *Water*, will do better in Glais vessels, than in Earthen.

14 Generally, those Things which are kept in the *Earth*, or in *Vaults* under *Grounds*, or in the *Bottom* of a *Well*, will preserve their Freshness longer, than those Things that are kept above *Ground*.

15 They say, it hath been observed; That in *Conservatories* of *Snow*, (whether they were in *Mountains*, in *Natural Pits*, or in *Wells* made by *Art*, for that purpose) an *Apple*, or *Chest-nut*, or *Nut*, by chance falling in, after many Moneths, when the *Snow* hath melted, hath been found in the *Snow*, as fresh and faire, as if they had been gathered the day before.

16 Country people keep *Clusters* of *Grapes* in *Meale*, which though it makes them lesse pleasant to the tast, yet it preserves their Moisture, and Freshness. Also the Harder sort of *Fruits* may be kept long, not only in *Meale*, but also in *Saw-dust*, and in *Heaps* of *Corn*.

17 There is an opinion held, That *Bodies* may be preserved Fresh in *Liquors* of their own kind; As in their proper *Menstrua*; As to keep *Grapes* in *wine*, *Olives* in *Oile*.

18 *Pomegranates*, and *Quinces*, are kept long, being lightly dipped in *Sea-water*, or *Salt-water*: And soon after taken out againe, and then dryed in the open *Aire*, so it be in the *Shade*.

19 *Bodies* put in *Wine*, *Oile*, or the *Lees* of *Oile*, keep long; Much more in *Honey*, or *Spirit of Wine*: But most of all, as some say, in *Quick-silver*.

20 *Fruits* enclosed in *Waxe*, *Pitch*, *Plaster*, *Paste*, or any the like Case, or Covering, keep green very long.

21 It is manifest, that *Flies*, *Spiders*, *Ants*, or the like small *Creatures*, falling by chance into *Amber*, or the *Gums* of *Trees*, and so finding a *Burial* in them, doe never after corrupt, or rot, although they be soft and tender *Bodies*.

22 *Grapes* are kept long by being hanged up in *Bunches*; The same is of other *Fruits*. For there is a twofold commodity of this Thing; The one, That they are kept without *Pressing*, or *Bruising*; which they must needs suffer, if they were laid upon any hard substance; The other, that the *Aire* doth encompassse them, on every side alike.

23 It is observed, that *Purrefaction*, no lesse than *Desiccation*, in *Vegetables*, doth not begin in every part alike; But chiefly in that part, where, being alive, it did attract *Nourishment*. Therefore some advise, to cover the *Stalks* of *Apples*, or other *Fruits*, with *Wax*, or *Pitch*.

24 Great *Wicks* of *Candles*, or *Lamps*, doe sooner consume the *Tallow*, or *Oile*, than lesse *Wicks*: Also *Wicks* of *Cotton*, sooner than those of *Rush*, or *Straw*, or small *Twigs*: And in *Staves* of *Torches*, those of *Juniper*, or *Firre*, sooner than those of *Ash*. Likewise, *Flame Moved*, and *Fanned* with the *Wind*, sooner than that which is *still*. And therefore *Candles*, set in a *Lantern*, will last longer, than in the *Open Aire*. There is a Tradition, that *Lamps* set in *Seputchres*, will last an incredible time.

25 The *Nature* also, and *Preparation* of the *Nourishment* conduceth no lesse, to the *Lasting* of *Lamps*, and *Candels*, than the *Nature* of the *Flame*: For *Wax* will last longer than *Tallow*; And *Tallow* a little wet, longer than *Tallow* dry; And *Wax Candles* old made, longer than *Wax Candles* new made.

26 *Trees*, if you stir the *Earth* about their *Roots* every *yeare*, will continue lesse time; If once in *four*, or perhaps in *ten* yeares, much longer: Also *Cutting* off the *Suckers*, and *Young Shoots*, will make them live the longer: But *Dunging* them, or laying of *Marle* about their *Roots*, or much *Watering* them, adds to their fertility, but cuts off from their long *Lasting*. And thus much touching the *Prohibiting* of *Desiccation*, or *Consumption*.

The *Inteneration*, or making Tender, of that which is *Dried*, (which is the chief Matter) affords but a small Number of *Experiments*. And therefore some few *Experiments*, which are found in *Living Creatures*, and also in *Man*, shall be joyned together.

27

Bands of Willow, wherewith they use to bind Trees, laid in water, grow more flexible; Likewise, they put *Boughes of Birch*, (the ends of them) in earthen pots filled with water, to keep them from *withering*; And *Bowles* cleft with *Drineffe*, steep in water, close again.

Boots, grown hard and obstinate with age, by greasing them before the fire with *Tallow*, wax soft; or being only held before the Fire, get some softness: *Bladders* and *Parchments*, hardened also, become tender, with warm water, mixed with *Tallow*, or any *Fat Thing*; but much the better, if they be a little *Chafed*.

28

Trees grown very old, that have stood long without any Culture, by *Digging* and *Opening* the Earth, about the *Roots* of them, seem to grow young again, and put forth young *Branches*.

29

Old *Drought Oxen*, worn out with labour, being taken from the yoke, and put into fresh pasture, will get young and tender flesh again; insomuch, that they will eat as fresh and tender, as a *Steele*.

30

A strict *Emaciating Diet*, of *Gnaticum*, *Bisket*, and the like; (wherewith they use to cure the *French Pox*, old *Catarrhs*, and some kind of *Droppies*;) doth first bring men to great *Poverty* and *Leanness*, by wasting the *Juyces* and *Humours* of the *Body*; which after they begin to be repaired again, seem manifestly more vigorous and young: Nay, and I am of opinion, that *Emaciating Diseases*, afterwards well cured, have advanced many in the way of *Long Life*,

31

Observations.

Men see clearly, like *Owles* in the *Night*, of their own *Notions*: But in *Experience*, as in the *Day-light*, they *wink*, and are but *half-sighted*. They speak much of the *Elementary Quality* of *Siccity*, or *Drienesse*: and of things *Deficcating*; and of the *Natural Periods* of *Bodies*, in which they are *corrupted*, and *consumed*: But mean-while, either in the *Beginnings*, or *Middle Passages*, or *Last Acts* of *Deficcation*, and *Consumption*, they observe nothing that is of *Moment*.

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Deficcation, or *Consumption*, in the *Process* thereof, is finished by three *Actions*; and all these (as was said before) have their *original* from the *Native Spirit* of *bodies*.

2

The first *Action* is, the *Attenuation* of the *Moisture* into *Spirit*: The second is, the *Issuing forth*, or *Flight* of the *Spirit*: The third, is the *Contraction*, of the *Grosser parts* of the *body*, immediately after the *Spirit* issued forth: And this last, is that *Deficcation*, and *Induration*, which we chiefly handle; The former two consume only.

3

Touching *Attenuation*, the matter is manifest. For the *Spirit*, which is enclosed in every *Tangible Body*, forgets not his *Natures*; but whatsoever it meets withal in the *body* (in which it is enclosed), that it can digest, and master, and turn into it self; That it plainly alters and subdivides, and multiplies it self upon it, and begets new *Spirit*. And this evienced by one proof in stead of many; For that those things, which are thoroughly *Dried*, are lessened in their *Weight*, and become *hollow*, *porous*, and re-sounding from within. Now it is most certain, that the *inward Spirit* of any thing, confers nothing to the *weight*; but rather lightens it; And therefore it must needs be, that the same *Spirit* hath turned into it, the *Moisture* and *Juice* of the *Body*, which weighed before; By which means the *weight* is lessened. And this is the first *Action*; the *Attenuation* of the *Moisture*, and converting it into *Spirit*.

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The second *Action*, which is the *issuing forth*, or *Flight* of the *Spirit*, is as manifest also. For that *issuing forth*, when it is in *throngs*, is apparent even to the *sense*; In *Vapours*, to the *sight*; in *Odours*, to the *smelling*: But if it *issueth forth slowly* (as when a thing is decayed by *Age*;) then it is not apparent to the *sense*; but the matter is the same. Against where the *composure* of the *body*, is either so *strait*, or so *tenacious*; that the *Spirit* can find no *pores*, or *passages*, by which to depart; Then, in the *striving* to get out, it drives before, it the *grosser parts* of the *body*; and protrudes them beyond the *superficies* or *surface* of the *body*: as it is in the *rust* of *Metals*; and *Mould* of all *Fat things*. And this is the second *Action*, the *issuing forth*, or *Flight* of the *Spirit*.

5

The third *Action* is somewhat more obscure, but full as certain: That is, The *Contraction* of the *Grosser parts*, after the *Spirit* issued forth. And this appears first, in that *bodies* after the *Spirit* issued forth, do manifestly shrink, and fill a less room; as it is in the

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the Kernels of Nuts, which after they are dried, are too little for the Shells; & in Beams & Planchers of Houses, which at first lay close together, but after they are dried, gape; And likewise in Bowles, which through Drought grow full of Crannies, The parts of the Bowle contracting themselves together, & after Contractio must needs be empirie Spaces. Secondly, it appears by the Wrinkles of Bodies Dried, For the Endeavour of Contracting it self is such; That by the Wrinkling, it brings the Parts nearer together, & so lifts them up; For what soever is Contracted on the sides, is lifted up in the Midst; And this is to be seen in Papers, and old Parchments; And in the Skins of Living Creatures; And in the Coats of Soft Cheeses; All which with Age, gather wrinkles. Thirdly, this Contraction shews it selfe Most, in those things, which by Heat, are notonely wrinkled, but ruffled, and plighted, and as it were, rowled together; As it is in Papers, and Parchments, and Leaves, brought neere the Fire. For Contraction, by Age, which is more Slow, commonly causeth wrinkles. But Contraction, by the Fire, which more speedy, causeth P lighing. Now in most Things, where it comes not to Wrinkling, or Plighting; there is simple Contraction, and Angulliation, or Straining, and Induration or Hardning, and Desiccation; As was shewed in the first Place: But if the Issuing forth of the Spirit: and Absumption, or wast, of the Moisture, be so great, That there is not left Bodie sufficient to unite and contract it self: Then, of Necessitie, Contraction must cease; And the bodie become putrid, And nothing else, but a little Dull, cleaving together which with a light touch, is dispersed, and falleth asunder: As it is in Bodies that are Rotten, and in Paper burnt: and Linnen made into Tinder: And Carcases Embalmed, after many ages. And this is the Third Action: The Contraction of the Groffer Parts, after the Spirit issued forth.

It is to be noted, That Fire, and Heat drie onely by Accident. For their proper Worke is, to attenuate, and dilate the Spirit, and Moisture: And then it follows by Accident, that the other Parts should contract themselves; Either for the Flying of Vacuum alone; Or for some other Motion withal: Whereof we now speak not.

It is certain that Putrefaction, takes his Original, from the Native Spirit, no lesse than Acefaction: But it goeth on a far different way; For in Putrefaction, the Spirit, is not simply vapoured forth: But being detained in Part, workes strange Garboiles; And the Groffer Parts, are not so much locally contracted, as they congregate themselves to Parts of the same Nature.



Length, and Shortnesse of Life in living Creatures.

The History.

To the first Article.

Touching the Length, and Shortnesse of Life in Living Creatures, the information, which may be had, is but slender; Observation is Negligent; And Tradition, Fabulous, In Tame Creatures, their Degenerate Life, corrupteth them; In wild Creatures, their Exposing to all weathers, often intercepteth them. Neither doe those Things which may seem Concomitants, give any Furtherance, to this Information, (The Greatnesse of their Bodies; Their Time of Bearing in the Womb; The Number of their Young ones; The Time of their Growth; And the Rest;) In Regard that these Things are Intermixed, and sometimes, they concur, sometimes they sever.

Mans Age (as farre as can be gathered by any certain Narration,) doth exceed the Age, of all other Living Creatures; Except it be, of a very few onely. And the Concomitants in him, are very equally disposed; His *Stature*, and *Proportion*, large; His *Bearing* in the *Womb*, nine Moneths; His *Fruir*, commonly, one, at a *Birth*; His *Pubertie* at the Age of Fourteen yeares; His *Time of Growing*, till Twenty.

The *Elephant*, by undoubted Relation, exceeds the Ordinary Race of *Mans* life: But his *Bearing* in the *Womb*, the space of ten yeares is fabulous; Of two yeares, or at least, above one, is certaine: Now his *Bulke* is great; His *Time of Growth*, untill the thirtieth yeare; His *Teeth* exceeding hard: Neither hath it been observed: That his *Bloud* is the coldest of all Creatures: His *Age*, hath sometimes reached to two hundred yeares.

Lions are accounted long *Livers*, because many of them, have been found *Toothlesse*; A signe not so certaine; For that may be caused by their strong *Breath*.

The *Bear* is a great *Sleeper*; A *Dull Beast*, and given to ease; And yet not noted

for

for long Life : *Nay*, he hath this signe of short Life ; That his *Bearing* in the *Wombe* is but short; scarce full forty dayes.

The *Fox* seemes to be well disposed, in many things, for long life; He is well skinned, feeds on Flesh, lives in Dens; And yet he is noted not to have that propertie. Certainly, he is a kind of *Dog*; And that kind is but short liv'd.

The *Camel* is a long Liver : A lean Creature, and Sinewy : So that he doth ordinarily attaine to Fifty; And sometimes to an hundred yeares.

The *Horse* lives but to a moderate Age; scarce to forty yeares; His Ordinary Period is Twenty yeares. But perhaps, he is beholding, for this shortnesse of Life, to *Man* : For we have now no *Horses* of the *Sunne*; That live freely, and at pleasure, in good pastures, Notwithstanding the *Horse* growes, till he be six yeares old; And is able for Generation, in his old age. Besides, the *Mare* goeth longer with her young one than a *Woman* : And brings forth two at a Burthen more rarely. The *Ass* lives commonly to the *Horses* age; But the *Mule* out-lives them both.

The *Hart* is famous amongst Men, for long Life; yet not upon any Relation, that is undoubted. They tell of a certain *Hart*, that was found with a Collar about his Neck, and that Collar hidden with *Fat*. The long Life of the *Hart*, is the lesse credible, because he comes to his perfection at the Fifth year; And not long after his *Hornes*, (which he sheds, and renews yearly) grow more Narrow at the Root, and lesse Branched.

The *Dog* is but a short Liver: He exceeds not the age of Twenty yeares; And for the most part lives not to fourteen yeares; A Creature of the hottest Temper, and living in extremes; for he is commonly, either in vehement Motion, or Sleeping, besides, the *Bitch*, bringeth forth many at a burthen, and goeth nine weeks.

The *Oxe* likewise, for the Geatnesse of his body, and strength, is but a short Liver; About some sixteen yeares: and the *Males* live longer than the *Females*: Notwithstanding, they beare, usually, but one at a Burthen, and goe nine Moneths a Creature dull fleshy, and soon fatted, and living onely upon Herby substances, without Graine.

The *Sheep* seldome lives to ten yeares; Though he be a Creature, of a moderate size, and excellently clad: And, that which may seem a wonder, being a Creature with so little a Gall, yet he hath the most curled coat, of any other; for the *Haire* of no Creature, is so much curled as *Wool* is. The *Rams* generate not before the third year, And continue able for Generation, untill the eighth: The *Ewes* beare young, as long as they live. The *Sheep* is a diseased Creature; And rarely lives to his full age.

The *Goat* lives to the same age, with the *Sheep*; and is not much unlike in other Things; Though he be a Creature more Nimble, and of som-what a firmer Flesh; and so should be longer liv'd: but then he is much more lascivious; and that shortens his Life.

The *Sow* lives to fifteen yeares, sometimes to twentie: and though it be a Creature of the Moistest Flesh; yet that seemes to make nothing to Length of Life. Of the *Wild Bear*, or *Sow*, we have nothing certaine.

The *Cats* age, is betwixt six, and ten yeares. A Creature nimble, and full of spirit, whose seed, (As *Aelian* reporteth) burneth the Female. Whereupon it is said, That the *Cat* conceives with pain, and brings forth with ease. A creature ravenous in eating, Rather swallowing down his Meat whole, than Feeding.

Hares and *Conies* attaine scarce to seven yeares: Being both Creatures Generative, and with young ones, of several conceptions, in their bellies: In this they are unlike, that the *Coney* lives under Ground, and the *Hare* above Ground; And againe, that the *Hare* is of a more dusky Flesh.

Birds, for the size of their Bodies, are much lesser than *Beasts*: for an *Eagle*, or *Swan*, is but a small thing in comparison of an *Oxe*, or *Horse*; And so is an *Estrich* to an *Elephant*.

Birds are excellently well clad: For *Feathers*, for warmth, and close fitting, to the Body, exceed *Wool*, and *Haires*.

Birds, though they hatch many young ones together, yet they beare them not all in their Bodies at once: But lay their Egges by turnes: whereby, their Fruit hath the more plentifull nourishment, whilst it is in their bodies.

Birds chew, little or nothing: but their meat is found whole in their crops: notwithstanding they will breake the shels of Fruits, and pick out the Kernels; they are thought to be, of a very hot and strong concoction.

- 20 The Motion of *Birds*, in their Flying, is a mixt Motion: Consisting, of a moving of the Limbs, and of a kinde of Carriage: which is, a most wholesome kinde of Exercise.
- 21 *Aristotle* notod well, touching the Generation of *Birds*: (But he transferred it ill to other living Creatures:) That the seed of the *Male*, confers lesse to Generation, than the *Female*: But that it rather affords Activity, than Matter: so that Fruitfull *Egges*, and unfruitfull *Egges*, are hardly distinguished.
- 22 *Birds*, (almost all of them,) come to their full Growth, the first year, or a little after: It is true, that their Feathers, in some kindes, and their bills, in others, shew their yeares; but for their Growth of their bodies, it is not so.
- 23 The *Eagle* is accounted a long Liver: yet his yeares are not set downe. And it is alledged, as a signe of his long life: That he casts his bill: whereby he growes young againe. From whence comes that Proverb: *The Old age of an Eagle*. Notwithstanding, perchance, the matter may be thus: That the renewing of the *Eagle* doth not cast his bill: but the casting of his bill, is the renewing of the *Eagle*: For after that his bill is grown, to a great crookednesse, the *Eagle* feeds, with much difficulty.
- 24 *Vultures* also are affirmed to be long Livers: In somuch that they extend their Life, well-neare to an hundred yeares: *Kites* likewise, and so all *Birds* that feed upon Flesh, and *Birds* of prey live long. As for *Hawkes*, because they lead a degenerate, and servile life, for the Delight of Men; The Tenne of their Natural Life is not certainly known: Notwithstanding, amongst *Mewed Hawkes*, some have been found, to have lived thirty yeares. And amongst *Wild Hawkes*, forty yeares.
- 25 The *Raven* likewise, is reported to live long: Sometimes, to an hundred yeares. He feeds on Carrion: And flies not often, but rather is a sedentarie, and Melancholy bird: and hath very black flesh. But the *Crow* like unto him in most things; (Except in Greatnesse, and voice;) lives not altogether so long: And yet is reckoned amongst the long Livers.
- 26 The *Swan*, is certainly found, to be a long Liver; and exceeds not unfrequently an hundred yeares. He is a *Bird* excellently plumed; A Feeder upon Fish; and is alwayes carried, And that in Running Waters.
- 27 The *Goose* also may passe amongst the Long-livers; Though his food be commonly Grasse, and such kind of Nourishment: Especially, the *Wild-Goose*; Whereupon, this Proverb grew amongst the Germans; *Magis senex quam Anser Nivalis*; Older than a *Wild-Goose*.
- 28 *Storks* must needs be Long-livers; If that be true, which was anciently observed of them; That they never came to *Thebes*, because that City was often sacked. This if it were so; then either, they must have the knowledge of more ages than one; Or else the old Ones, must tell their young, the History. But there is Nothing more frequent than *Fables*.
- 29 For *Fables* doe so abound, touching the *Phoenix*; That the truth is utterly lost, if any such *Bird* there be. As for that, which was so much admired; That she was ever seen abroad, with a great Troope of *Birds* about her; it is no such wonder: For the same is usually seen, about an *Owle* flying in the Day time, or a *Parret* let out of a Cage.
- 30 The *Parret*, hath been certainly known, to have lived threecore yeares in *England* How old soever he was, before he was brought over. A *Bird*, eating almost all kinde of meats, chewing his meate, and renewing his Bill; Likewise, curst, and mischievous and of a black Flesh.
- 31 The *Peacock* lives twenty yeares; But he comes not forth with his *Argus Eyes*, before he be three yeares old: A *Bird* slow of pace, having whitish Flesh.
- 32 The *Dung-hill Cock*, is venerous, Martial, and but of a short life; A cranke *Bird*, having also white flesh.
- 33 The *Indian-Cock*, commonly called, The *Turkey-Cock*, lives not much longer, than, the *Dung-hill Cock*: An angry *Bird*, and hath exceeding white flesh.
- 34 The *Ring-Doves*, are of the longest sort of Livers; In somuch, that they attaine, sometimes, to fifty yeares of Age: An *Aery Bird*; And both builds, and sits, on high: But *Doves*, and *Turtles*, are but short liv'd, not exceeding eight yeares.
- 35 But *Pheasants*, and *Partridges*, may live to sixteen yeares: They are great breeders; but not so white of Flesh, as the ordinary *Pullen*.

The *Black-Bird* is reported to be, amongst the lesser birds, one of the longest livers: An unhappy bird, and a good singer. 36

The *Sparrow* is noted to be of a very short life; and it is imputed in the Males, to their lasciviousness. But the *Linnet*, no bigger in body, than the *Sparrow*, hath been observed to have lived twenty yeares. 37

Of the *Esfrich* we have nothing certain: Those that were kept here, have been so unfortunate, that no long life appeared by them. Of the bird *Ibis*, we find onely, that he liveth long; but his yeares are not recorded. 38

The age of *Fishes* is more uncertain than that of terrestrial Creatures; because living under the water, they are the lesse observed, any of them breath not; by which meanes their vital Spirit is more closed in: And therefore, though they receive some refrigeration by their Gills, yet that refrigeration is not so continual, as when it is by breathing. 39

They are from the *Desiccation*, and *Depredation* of the *Aire Ambient*, because they live in the water: yet there is no doubt, but the *Water Ambient*, and piercing, and received into the pores of their Body, doth more hurt to long life, than the *Aire* doth. 40

It is affirmed too, that their bloud is not warm: Some of them are great devourers, even of their own kinde. Their flesh is softer, and more tender, than that of terrestrial Creatures. They grow exceedingly fat; insomuch that an incredible quantity of oil will be extracted out of one *Whale*. 41

Dolphins are reported to live about 30 yeares: of which thing a trial was taken in some of them, by cutting off their tails: They grow untill ten yeares of age. 4

That which they report of some *Fishes* is strange, that after a certain age, their bodies will waste, and grow very slender; only their head and taile retaining their former greatnesse. 43

There were found in *Casars* Fish-ponds, *Lampreyes* to have lived threescore yeares: They were grown so familiar with long use, that *Crassus* the Orator solemnly lamented one of them. 44

The *Pike*, amongst *Fishes*, living in *Fresh water*, is found to last longest; sometimes to forty yeares: He is a *Ravener*, of a flesh somewhat dry and firm. 45

But the *Carp*, *Bream*, *Tench*, *Eele*, and the like, are not held to live above ten yeares. 46

Salmons are quick of growth, short of life, so are *Trouts*: but the *Perch* is slow of growth, long of life. 47

Touching that monstrous bulk of the *Whale*, or *Orke*, how long it is weiled by vital spirit, we have received nothing certain; neither yet touching the *Sea-calf*; and *Sea-hog*, and other innumerable *Fishes*. 48

Crocodiles, are reported to be exceeding long-liv'd, and are famous for the time of their growth, for that they, amongst all other creatures, are thought to grow during their whole life. They are of those Creatures that lay Egges, ravenous, cruel, and well-fenced against the waters. Touching the other kinds of *Shel-fish*, we find nothing certain, how long they live. 49

Observations.

TO finde out a Rule touching Length and Shortnesse of Life, in Living Creatures is very difficult, by reason of the negligence of observations, and the intermixing of Causes: A few things we will set down. 1

There are more kinds of Birds found to be long-liv'd, than of Beasts; (as the *Eagle*,) the *Vulture*, the *Kite*, the *Pelican*, the *Raven*, the *Crow*, the *Swan*, the *Goose*, the *Stoike*, the *Crane*, the bird called the *Ibis*, the *Parret*, the *Ring-dove*, with the rest, though they come to their full growth within a yeare, and are lesse of bodies: surely their clothing is excellent good against the distemperatures of the weather. And besides, living for the most part, in the open aire, they are like the inhabitants of pure *Mountaines*, which are long-liv'd. Again, their Motion, which (as I elsewhere said) is a mixt Motion, compounded of a moving of their Limbs, and of a carriage in the aire, doth lesse wearie and weare them, and any is more wholesome. Neither doe they suffer any compression, or want of nourishment in their mothers bellies: because the Egges are laid by turnes: But the chiefest cause of all I take to be this, that Birds are made more of the substance of the Mother, 2

Mother, than of the Father, whereby their Spirits is not so eager and hot.

It may be a position; that Creatures, which partake more of the substance of their Mother, than of their Father, are longer-liv'd; As Birds are; which was said before. Also that those which have a longer time of Bearing in the womb, doe partake more of the substance of the Mother, lesse of the Father: And so are longer-liv'd: Inasmuch that I am of opinion; that even amongst Men; (which I have noted in some,) those that resemble their Mothers most, are longest liv'd: And so are the children of old Men, begotten upon young wives; If the Fathers be sound, not Diseas'd.

The First Breeding of Creatures, is ever most Material, either to their Hurt, or Benefit. And therefore it stands with Reason; That the lesse Compression, and the more liberal Alimentation of the young one, in the womb, should conferre much to Long Life; Now this happens, when either the young ones, are brought forth successively. as in Birds; Or when they are single Births; As in Creatures bearing but one at a Burthen.

But Long Bearing, in the wombe, makes for Length of Life three ways. First, for that the young one partakes more of the substance of the Mother; As hath been said. Secondly, that it comes forth more strong, and able, Thirdly, that it undergoes the predatorie Force of the Aire, later. Besides it shewes, that Nature intendeth to finish her periods, by larger Circles. Now though Oxen and Sheep, which are borne in the womb, about six Moneths, are but short liv'd: That happens for other Causes.

Feeders upon Grasse, and meer Herbs, are but short Livers; And Creatures feeding upon Flesh, or Seeds, or Fruits, long Livers; As some Birds are. As for Harts, which are long liv'd, They take the one halfe of their meat, (As men use to say) from above their Heads. And the Goose besides Grasse, findeth something in the water, and stubble to feed upon.

We suppose that a good Clothing of the Body, maketh much to long Life: For it Fenceth, and Armeth against the Intemperances of the Aire, which doe wonderfully Assail, and Decay the Body: which Benefit Birds especially have. Now that Sheep, which have so good Fleeces, should be so short liv'd; That is to be imputed to Diseases, whereof that Creature is full; and to the bare eating of Grasse.

The seat of the Spirits, without doubt, is principally the Head: Which though it be usually understood, of the Animal Spirits onely, yet this is all in all. Again, it is not to be doubted, but the Spirits doe, most of all, waste, and prey upon the Body; so that when they are either in greater plenty; Or in greater Inflammation, and Acrimonic; There the life is much shortned. An! therefore I conceive, a great cause of long life, in Birds, to be; The Smallness of their Heads, in comparison of their Bodies: For even Men, which have very great Heads, I suppose to be the shorter Livers.

I am of opinion. That Carriage, is of all other Motions, the most helpful to long life; which I also noted before. Now there are carried; Water-Fowles, upon the water; As Swans: All Birds in their flying, but with a strong Endeavour of their Limbs; And Fishes, of the length of whose life we have no certaintie.

Those Creatures which are long, before they come to their perfection: (Not speaking of Growth in stature onely, but of other Steps to Maturity; As Man puts forth, First, his Teeth; Next the Signes of Pubertie; Then his Beard; And so forward:) are Long-liv'd. For it shewes, that Nature finisheth her Periods, by larger Circles.

Milder Creatures, are not Long-liv'd: As the Sheep, and Dove: For Cholera is as the Whetstone and Spur, to many Functions in the Body.

Creatures, whose Flesh is more Duskish, are longer liv'd than those that have white Flesh: For it sheweth that the Juice of the Body is more firm, and lesse apt to dissipate.

In every corruptible Body, Quantity maketh much to the Conservation of the whole: For a great fire is longer in quenching: A small portion of water is sooner evaporated: The Body of a Tree withereth not so fast as a Twig: And therefore generally: I speak it of Species, not of Individuals:) Creatures that are large in Body, are longer liv'd than those that are small, unlesse here be some other potens Cause to hinder it.

Alimentation, or Nourishment: And the way of Nourishing.

The History.

Nourishment ought to be of an Inferiour nature, and more simple substance, than the thing nourished. *Plants* are nourished with the Earth and Water; *Living Creatures* with *Plants*; *Man* with *Living Creatures*: There are also certain *Creatures* feeding upon *Flesh*; And *Man* himselfe, takes *Plants*, into a part of his Nourishment: But *Man*, and *Creatures* feeding upon *Flesh*, are scarcely nourished with *Plants* alone. Perhaps, of *Plants*, or *Graines*; baked, or boyled, may, with long use, nourish them; But *Leaves*, of *Plants*, or *Herbs*, will not doe it; As the *Order* of the *Foliatanes* shewed by Experience.

Over-great *Affinity*, or *Consubstantiality* of the *Nourishment*, to the Thing nourished, proveth not well: *Creatures*, feeding upon *Herbs*, touch no *Flesh*; And of *Creatures* feeding upon *Flesh*, few of them eat their own kind; As for *Men*, which are *Cannibals*, they feed not ordinarily upon *Mens* *Flesh*; But reserve it as a *Dainty*, either to serve their *Revenge* upon their *Enemies*, or to satisfy their *Appetite* at some times. So the *Ground* is best sowne, with *Seed* growing elſewhere; And *Men* doe not use to *Graft*, or *In-oculate*, upon the same stock.

By how much the more the *Nourishment* is better *Prepared*, and approacheth neerer in likenesse to the Thing nourished; By so much the more, are *Plants* more *Fruitfull*; And *Living Creatures* in better liking, and plight. For a young *Slip*, or *Cions*, is not so well nourished, if it be pricked into the *Ground*; As if it be grafted into a *Stock*, a greening with it in *Nature*; And where it finde the *Nourishment* already digested, and prepared: Neither, (as is reported,) will the *Seed* of an *Onion*, or some such like sown in the bare earth, bring forth so large a *Fruit*, as if it be put into another *Onion*; Which is a new kind of *Grafting*: Into the *Root*, or under ground: Againe, it hath been found out lately; That a *Slip* of a *Wild-tree*; As of an *Elme*, *Oke*, *Ash*, or such like grafted into a *Stock* of the same kinde, will bring forth larger *Leaves*, than those that grow without *Grafting*: Also *Men* are not nourished so well with *Raw* *Flesh*, as with that which hath passed the *Fire*.

Living Creatures are nourished by the *Mouth*; *Plants* by the *Root*; *Young ones* in the *Womb* by the *Navil*: *Birds*, for a while, are nourished with the *Tolke* in the *Egg*; whereof some is found in their *Crops*, after they are hatched.

All *Nourishment* moveth, from the *Center*, to the *Circumference*; Or, from the *Inward*, to the *Outward*; yet it is to be noted; That in *Trees*, and *Plants*, the *Nourishment* passeth, rather by the *Barke*, and *outward* *Parts*, than by the *Pith*, and *inward* *parts*: For if the *Barke* be pilled off, though but for a small breeth, round, they live no more: And the *bloud* in the *Veines* of *Living Creatures*, doth no lesse nourish the *Flesh* beneath it, than the *Flesh* above it.

In all *Alimentation*, or *Nourishment*, there is a two-fold *Action*; *Extusion* and *Attraction*: whereof the former proceeds from the *Inward* *Function*, the later from the *Outward*.

Vegetables assimilate their *Nourishment* simply, without *Excerning*: For *Gums*, and *Tears* of trees, are rather *Exuberances*, than *Excrements*: And *knots*, or *knobs*, are nothing but *Diseases*. But the substance of *Living Creatures* is more perceptible, of the like; And therefore it is conjoyned with a kind of *Disdain*; whereby it rejecteth the bad, and assimilateth the good.

It is a strange thing, of the *Stalks* of *Fruits*; That all the *Nourishment*, which produceth, sometimes, such great *Fruits*, should be forced to passe thorow so narrow *Necks*: For the *Fruit* is never joyn'd to the *Stock*, without some *Stalke*.

It is to be noted; That the *Seeds* of *Living Creatures* will not be fruitful, but when they are new shed; but the *Seeds* of *Plants*, will be fruitfull a long time, after they are gathered. Yet the *Slips*, or *Cions* of trees, will not grow, unless they be grafted green; Neither will the *Roots* keep long fresh, unless they be covered with earth.

In *Living Creatures* there are *Degrees* of *Nourishment*, according to their *Age*: In the *Womb*, the young one is nourished with the *Mothers* *bloud*; when it is new-born, with *Milk*; Afterwards with *Meats*, and *Drinks*, And in old age, the most *Nourishing*, and *Savoury* *Meats*, please best.

To the 4
Article.

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II

Above all, it maketh to the present *Inquisition*; To inquire diligently, and Attentively whether a Man may not receive *Nourishment* from without; At least some other way, beside the Mouth? We know, that Baths of Milke are used in some *Hillick Fevers*, and when the Body is brought extremelow; And *Physicians* doe prescribe *Nourishing Glysters*: This Matter would be well studied; For if *Nourishment* may be made, either from without, or some other way, than by the Stomach: Then the weaknesse of Concoction, which is incident to old men, might be recompensed by these Helps; And Concoction restored to them, intire.



Length and Shortnesse of Life in Man.

The Historie.

To the 5, 6,
7, 8, 9, and
II Article.

I

BEfore the *Floud*, as the *Sacred Scripture* relate, *Men* lived many Hundred years: Yet none of the *Fathers* attained to a full Thousand. Neither was this *Length of Life*, peculiar only to *Grace*, or the *Holy line*; For there are reckoned of the *Fathers*, untill the *Floud* eleven Generations; But of the Sons of *Adam*, by *Cain*, onely eight Generations; So as the *Posteritie* of *Cain* may seem the longer-liv'd. But this *Length of Life*, immediately after the *Floud*, was reduced to a Moitie; But in the *Post-Nati*: For *Noah*, who was borne before, equalled the Age of his Ancestours; and *Sem* saw the six hundredth yeare of his life. Afterward, three Generations being run from the *Floud*; The *Life of Man* was brought downe, to a Fourth Part of the Primitive Age; That was, to about two Hundred yeares.

2

Abraham lived an hundred seventie and five yeares: A Man of an High Courage, and prosperous in all things. *Isaac* came to an hundred and eighty yeares of Age; A chaste Man, and enjoying more Quietnesse, than his Father. But *Jacob* after many Croffes and a numerous progeny, lasted to the Hundredth forty seventh yeare of his Life; A Patient, Gentle, and wife Man. *Ishmael*, a Military Man, lived an Hundred thirtie and seven yeares. *Sarah* (whose yeares only amongst women, are recorded) died in the Hundred twenty seventh yeare of her Age: A Beautifull, and Magnanimous Woman; A singular good Mother, and Wife; and yet no lesse Famous, for her Libertie, than Obsequiousnesse towards her Husband. *Joseph* also, a Prudent, and Politick Man: Passing his youth in Affliction, afterwards advanced to the Height of Honour and Prosperity, lived an hundred and ten yeares. But his Brother *Levi*, elder than himselfe, attained to an hundred thirty seven yeares; A Man Impatient of Contumely, and Revengful. Near unto the same Age, attained the *Sonne of Levi*; Also his *Grand-Child*; The *Father of Aaron*, and *Moses*.

3

Moses lived an Hundred and Twenty yeares: A Stout Man, and yet the *Meekest upon the Earth*: And of a very *Slow Tongue*. Howsoever *Moses*, in his *Psalmes*, pronounceth, That the life of Man is but seventy yeares; And if a Man have Strength, then eighty; Which Terme of Mans Life standeth firme, in many Particulars, even at this Day. *Aaron*, who was three yeares the Eider, died the same year, with his *Brother*: A Man of a reader Speech, of a more facile Disposition and lesse Constant. But *Phineas*, Grand-child of *Aaron* (Perhaps, out of extraordinary Grace,) may be collected, to have lived three hundred yeares; If so be, the *War* of the *Israelites*, against the *Tribe of Benjamin* (In which Expedition, *Phineas* was consulted with) were performed in the same order of Time, in which the *History* hath ranked it: he was a Man of a most Eminent Zeale. *Joshua*, a Martial Man, and an excellent Leader, and evermore victorious, lived to the Hundred and Tenth yeare of his Life. *Caleb* was his Contemporary; And seemeth to have been of as great yeares. *Ehud* the Judge, seemes to have been no lesse than an hundred yeares old; In regard, that after the Victory over the *Moabites*, the *Holy land* had rest, under his Government, eighty yeares: He was a Man Fierce, and undaunted; The one, that in a sort, neglected his Life for the good of his People.

4

Job lived, after the Restauration of his Happinesse, an Hundred and Fortie yeares; Being, before his Afflictions, of that age, that he had sons at Mans Estate: A Man Politick,

lirick, Eloquent, Charitable, and the *Example of Patience*. *Eli* the Priest lived Ninety eight yeares, A corpulent Man, Calme of disposition, and Indulgent to his children. But *Elizabeth* the *Prophet*, may seem to have died, when he was above an hundred yeares old; For he is found to have lived after the *Assumption* of *Elias*, sixty yeares; And at the time of that *Assumption*, he was of those yeares, that the Boyes mocked him, by the name of *Bald-head*: A Man vehement, and severe, and of an Austere life, and a Contemner of Riches. Also *Isaiah* the *Prophet* seemeth to have been an Hundred yeares old, For he is found, to have exercised the Function of a *Prophet*, Seventie yeares together; The yeares, both of his Beginning to Prophecie, and of his Death, being uncertain: A Man of an Admirable Eloquence, An *Evangelical Prophet*: Full of the Promises of God, of the New Testament, as a Bottle with sweet Wine.

Tobias the Elder, lived an Hundred fifty eight yeares: The younger, an Hundred twenty seven: Mercifull Men, and great Almes-Givers. It seemes, in the time of the *Captivity*, many of the *Jewes*, who returned out of *Babylon*, were of great yeares: Seeing they could remember both *Temples* (there being no lesse than seventy yeares betwixt them;) And wept for the unlikenesse of Them. Many ages after that, in the Time of our *Saviour*, lived old *Simeon*, to the age of Ninetic yeares: A Devout Man, and full, both of Hope, and Expectation. Into the same time also, fell *Anna* the *Prophetesse*, who could not possibly belesse than an Hundred yeares old: For she had been seven yeares a Wife; about eighty four yeares a Widow; Besides the yeares of her Virginitie; And the time that she lived after her Prophecie of our *Saviour*. She was an Holy Woman: And passed her dayes in Fastings and Prayers.

The *Long Lives of Men*, mentioned in *Heathen Authors*, have no great certainty in Them: Both for the Intermixture of Fables, wherunto those kind of Relations were very prone, and for their false Calculation of yeares. Certainly, of the *Egyptians*, we finde nothing of Moment in those workes that are extant, as touching *Long Life*: For their *Kings*, which reigned longest, did not exceed fifty, or five and fifty yeares, which is no great matter; Seeing many at this day, attaine to those yeares. But the *Arcadian Kings*, are fabulously reported to have lived very long. Surely, that Countrey was Mountainous, Full of Flocks of Sheep, and brought forth most wholsome Food, Notwithstanding, seeing *Pan* was their God, we may conceive, that all Things about them were *Panicks*, and vaine, and subject to Fables.

Numa, King of the *Romans* lived to eighty yeares: A Man peaceable, Contemplative, and much devoted to Religion. *Marcus Valerius Corvinus*, law an hundred yeares compleat: There being betwixt his first and sixth *Consulship*, Forty six yeares: A Man Valorous, Affable, Popular, and always Fortunate.

Solon of *Athens*, the *Law-giver*, and one of the seven *Wise-men*, lived above eighty yeares: A Man of an High Courage, but Popular, and affected to his Countrey: Also Learned, given to Pleasures, and a soft kind of Life. *Epimenides* the *Cretian* is reported to have lived an hundred fifty seven yeares: The Matter is mixt with a *Prodigious Relation*: For fifty seven of those yeares, he is said to have slept in a *Cave*. Halfe an Age after, *Xenophon* the *Colophonian*, lived an hundred and two yeares, or rather more: For at the Age of Twenty five yeares he left his Countrey; Seventy seven compleat yeares he travelled: And after that returned: But how long he lived after his returne, appears not: A Man, no lesse wandering in Mind, than in Body: For his Name was changed, for the Madnesse of his Opinions, from *Xenophanes* to *Xenomanes*: A man no doubt, of a vaile Conceit, and that minded nothing but *Infinium*.

Anacreon, the Poet, lived eighty yeares, and somewhat better: a man Lascivious, Voluptuous, and given to Drinke. *Pindarus*, the *Theban*, lived to eighty yeares: a Poet of an high Fancie, singular in his Conceits, and a great Adorer of the *Gods*. *Sophocles* the *Athenian*, attained to the like Age: A loily Tragick Poet, given over wholly to Writing, and Neglectfull of his Family.

Artaxerxes, King of *Persia*, lived ninety four yeares: A Man of a Dull wit, Averse to the Dispatch of Businesse, Desirous of glory, but rather of Ease. At the same time lived *Agefilans*, King of *Sparta*, to eighty four yeares of Age: a moderate Prince: As being a *Philosopher* amongst *Kings*. But notwithstanding Ambitious, and a Warrior; And no lesse it out in Warre than in Businesse.

Gorgius, the *Sicillian*, was an hundred and eight yeares old: A *Rhetorician*, and a great Boatter of his Faculty: One that taught Youth for profit: He had teen many Countries:

Countries; And a little before his Death said, That he had done nothing worthy of blame, since he was an old Man. *Protagoras* of *Abdera*, saw Ninety yeares of Age; This Man was likewise a *Rhetorician*, But professed not so much to teach the Liberal Arts, as the Art of Governing Common-wealths, and States: Notwithstanding, he was a great Wanderer in the World, no lesse than *Gorgias*. *Isocrates*, the *Athenian*, lived Ninety eight yeares: He was a *Rhetorician* also, but an exceeding modest Man, One that shunned the Publike Light; and opened his Schoole only in his owne Houle. *Democritus* of *Abdera*, reached to an hundred and nine yeares: He was a great Philosopher; And, if ever any Man amongst the *Grecians*, a true *Naturalist*: A Surveyour of many Countries, but much more of Nature; also a diligent searcher into Experiments; and (as *Aristotle* objected against him.) One that followed Similitudes, more than the Laws of Arguments. *Diogenes* the *Sinopean*, lived ninety yeares: A Man, that used Liberty towards others, but Tyranny over Himselfe; of a course Diet, and of much Patience. *Zeno* of *Citium*, lacked but two yeares of an Hundred: A man of an high Minde, and a Contemner of other mens opinions; also of a great Acutenesse, but yet not troublelome, choosing rather to take Mens Minds, then to enforce them: The like whereof afterward was in *Seneca*. *Plato* the *Athenian*, attained to eighty one yeares; a Man of a great Conrage, but yet a Lover of Ease; In his Notions Sublimed, and a of Fancie; Neat and Delicate in his Life; Rather calme, than Merry; and one, that carried a kinde of Majestie in his Countenance. *Theophrastus* the *Eresian*, arrived at 85 yeares of Age; A Man sweet for his eloquence, sweet for the Variety of his Matters; and Who selected the pleasant Things of Philosophy; and let the Bitter and Harsh goe. *Carneades* of *Cyrene* many yeares after, came to the like age, of eighty five yeares: A Man of a fluent Eloquence; and one, who by the acceptable, and pleasant Varietie of his Knowledge, delighted, both himselfe, and others. But *Orbilium*, who lived in *Cicero's* time; No *Philosopher*, or *Rhetorician*; But a *Grammarians*; Attained to an hundred yeares of Age: He was first a Souldier, then a School-master; A Man by nature tart, both in his Tongue, and Pen; and severe towards his Scholars.

12 *Quintus Fabius Maximus*, was *Augur* sixty three yeares, which shewed him to be above eighty yeares of age, at his Death. Though it be true, that in the *Augurship*, Nobility was more respected, than age. A wise Man, and a great *Deliberator*, and in all his proceedings Moderate, and not without Affability severe. *Masinissa*, King of *Numbidia*, lived ninety yeares; And being more than eighty five, got a Sonne: a Daring Man, and trusting upon his Fortune; who in his youth, had tasted of the Inconstancy of Fortune; But in his succeeding age, was constantly happy. But *Marcus Porcius Cato*, lived above ninety yeares of Age; a man of an Iron body and minde; He had a bitter Tongue, and loved to cherish factions: He was given to Husbandry; and was to Himselfe, and his Family, a Physician.

13 *Terentia*, *Cicero's* wife, lived an hundred and three yeares: a woman afflicted with many Crosses; First, with the Banishment of her Husband; Then with the Difference betwixt them; Lastly, with his last Fatal Misfortune; She was also oftentimes vexed with the *Gout*. *Luccia* must needs exceed an hundred, by many yeares; For it is said, That she acted, an whole hundred yeares, upon the Stage; at first, perhaps, representing the person of some young Girdle; at last, of some Decrepit old Woman. But *Galeria Copiola*, A Player also, and a Dancer, was brought upon the Stage as a Novice, in what yeare of her Age, is not known, but ninety nine yeares after, at the *Dedication* of the *Theater*, by *Pompey the Great*, she was shewn upon the Stage; Not now for an *Actresse*, but for a wonder; Neither was this all, for after that, in the *Solemnities*, for the Health and Life of *Augustus*, she was shewn upon the Stage the third time.

14 There was another *Actresse*, somewhat Inferiour in age, but much Superiour in Dignity, which lived well-nearc ninety yeares: I meane *Luvia Julia Augustus*, wife to *Augustus Caesar*, and Mother to *Tiberius*. For if *Augustus* his Life were a play; (as himselfe would have it: when as upon his Death-bed, he charged his Friends, they should give him a *Plaudite*, after he was Dead,) certainly this *Lady* was an excellent *Actresse*; who would carry it so well with her Husband, by a dissembled Obedience; and with her Sonne, by power and authoritie: a woman affable, and yet of a Matronal Carriage, Pragmatical, and up-holding her power. But *Junia*, the wife of *Cains Cassius*, and sister of *Marcus Brutus*, was also ninety yeares old; For she survived the *Philippick Battaille*, sixty four yeares: a Magnanimous woman; In her great wealth

Happy ; In the calamity of her Husband, and near Kinsfolks, and in a long widow-hood, unhappy ; Notwithstanding much honoured of all,

The *yeare* of our Lord seventy six, falling into the Time of *Vespasian*, is Memorable ; In which we shall finde, as it were, a *Calender* of long-liv'd Men : For that year, there was a *Taxing* ; (Now a *Taxing*, is the most Authentical, and truest Informer, touching the ages of men ;) And in that part of *Italy*, which lieth betwixt the *Apennine Mountains*, and the *River Po*, there were found an hundred and four and twenty persons ; that either equalled, or exceeded, an hundred years of Age : Namely, of an hundred years just, fifty four persons ; Of an hundred and ten, fifty seven persons ; Of an hundred and five and twenty, Two onely ; Of an hundred and thirty, four men ; Of an hundred and five and thirty, or seven and thirty, four more ; Of an hundred and forty, three men. Besides these, *Parma* in particular, afforded five, whereof three fulfilled an hundred and twenty years ; and two an hundred and thirty : *Bruxels* afforded one, of an hundred and twenty five years old : *Placencia* one, aged an hundred thirty and one : *Faventia*, one Woman, age one hundred thirty and two : A certain Town, then called *Velleiacium*, situate in the *Hills*, about *Placencia*, afforded ten ; whereof six fulfilled an hundred and ten years of age ; Four, an hundred and twenty : Lastly, *Rimino* one, of an hundred and fifty years, whose Name was *Marcus Apennin*.

That our Catalogue might not be extended too much in length, we have thought fit, as well in those whom we have rehearsed, as in those whom we shall rehearse, to offer none under eighty yeares of Age. Now we have affixed to every one a true and short Character, or Elogie ; But of that sort, whereunto in our judgement, Length of Life (which is not a little subject to the Manners and fortunes of men) hath some Relation : And that in a two-fold Respect : Either that such kinde of Men, are for the most part long-liv'd ; Or that such Men may sometimes be of long life, though otherwise not well disposed for it.

Amongst the *Roman & Grecian Emperours* ; Also the *French and Almain* ; To these our *Dayes*, which make up the Number of well near two hundred *Princes* ; There are onely four found, that lived to eighty yeares of Age ; unto whom we may add the two first Emperours, *Augustus*, and *Tiberius* ; whereof the latter fulfilled the seventy and eighth yeare, the former the seventy and sixth yeares of his age, and might both perhaps have lived to fourscore, if *Livia* and *Caius* had been pleased. *Augustus* (as was said) lived seventy and six yeares : A man of moderate Disposition ; In accomplishing his Designs, vehement, but otherwise Calm and Serene ; In meat and drinke sober, In Venerie intemperate ; Through all his life-time Happy ; and who about the thirtieth yeare of his life, had a great and dangerous sickness ; Infomuch as they despaired of Life in him ; whom *Antonius Musa* the Physician, when other Physicians had applied hot Medicines, as most agreeable to his Disease, on the contrary cured with cold Medicines ; which perchance might be some helpe, to the prolonging of his Life. *Tiberius* lived to be two yeares older ; A man with leane chaps, as *Augustus* was wont to say ; For his speech stuck within his Jawes, but was weighty ; He was bloudy, a Drinker, and one that took Lust into a part of his Diet : Notwithstanding, a great Observer of his Health ; Infomuch, that he used to say ; That hee was a fool, that after thirty yeares of Age, took advice of a Physician. *Gordian* the Elder, lived eighty yeares ; And yet died a violent death, when he was scarce warm in his Empire ; A man of an high spirit, and Renowned ; Learned, and a Poet ; and constantly happy, through-out the whole course of his life, save onely, that he ended his dayes by a violent Death. *Valerian* the Emperour, was seventy six yeares of Age, before he was taken Prisoner, by *Sapor* King of *Persia* ; After his Captivity, he lived seven yeares in Reproaches, and then died a violent Death also : A man of a poor Minde, and not valiant ; Notwithstanding lifted up in his own, and the opinion of Men, but falling short in the performance. *Anastatius*, surnamed *Dicorus*, lived 88 yeares : He was of a settled minde, but too abject, and superstitious, and fearfull. *Amicus Justinianus* lived to eighty three yeares : a man Greedy of Glory ; performing nothing in his own person, but in the valour of his Captains happy and renowned ; Uxorious, and not his own Man, but suffering others to lead him. *Helena* of *Brittain*, mother of *Constantine* the Great, was fourscore yeares old : a woman, that inter-medled not in matters of state, neither in her husbands, nor sons reign ; but devoted her self wholly to Religion ; magnanimous, & perpetually flourishing. *Theodora* the Emperess (who was Sister to *Zoës*,

wife of *Monomachus*; And reigned alone after her Decese;) lived above eighty years: a Pragmatical Woman, and one that took delight in Governig; Fortunate in the highest degree, and through her good Fortunes Credulous.

17

We will proceed now from these *Secular Princes*, to the *Princes* in the Church. *St. John* an Apostle of our Saviour, and the Beloved Disciple, lived ninety three years: He was rightly denoted under the Embleme of the Eagle, for his piercing sight into the Divinity; And was as a Seraph amongst the Apostles in respect of his burning Love. *Saint Luke* the Evangelist, fulfilled four-score and four years: An Eloquent man, and a Traveller; *Saint Paul's* inseparable Companion, and a Physician. *Simeon* the son of *Cleophas*, called the Brother of our Lord, and Bishop of *Hierusalem*, lived an hundred and twenty years; though he was cut short by Martyrdome; A stout Man, and Constant, and full of Good works. *Polycarpus*, Disciple unto the Apostles, and Bishop of *Smyrna*, seemeth to have extended his Age, to an hundred years, and more; Though he were also cut off by Martyrdome: A Man of an High minde, of an Heroicall patience, and un-wearied with Labours. *Dionysius Areopagita*, Contemporary, to the Apostle *Saint Paul*, lived ninety years: He was called, *The Bird of Heaven* for his high-flying Divinity: And was famous, as well for his Holy Life; as for his Meditations. *Aquila* and *Priscilla*, first, *Saint Paul* the Apostles Hots; Afterward his Fellow-Helpers, lived together in an happy and famous Wed-lock, at least, to an hundred years of age a piece: For they were both alive, under Pope *Xystus* the First: A Noble pair, and prone to all kinde of Charity; who amongst other their Comforts; (which no doubt were great, unto the first Founders of the Church;) Had this added; To enjoy each other so long, in an happy marriage. *Saint Paul*, the Hermit, lived an hundred and thirteen years: Now he lived in a Cave; His diet was so slender, and strict, that it was thought almost impossible, to support Humane Nature there-withal: He passed his yeares onely in Meditations, and Soliloquies; yet he was not illiterate, or an Ideot, but Learned. *Saint Anthony*, the first Founder of Monks, or (as some will have it,) the Restorer onely, attained to an hundred and five years of Age: A Man Devout, and Contemplative; Though not unfit for Civill Affairs: His Life was Austere, and Mortifying; Norwithstanding he lived in a kinde of glorious solitude; And exercised a Command; For he had his Monkes under him. And besides, many Christians and Philosophers came to visit him, as a living Image, from which they parted not without some Adoration. *Saint Athanasius* exceeded the term of eighty years; A Man of an Invincible Constancy; Commanding Fame, and not yielding to Fortune; He was free towards the Great ones; With the people Gracious; and acceptable; Beaten and practised to Oppositions; And in delivering himself from them, stout, and wise. *Saint Hierome*, by the consent of most Writers, exceeded ninety yeares of Age: A man powerful in his Pen, and of a Manly Eloquence; Variously learned, both in the Tongues, and Sciences; Also a Traveller, and that lived strictly towards his old Age; In an estate private, and not dignified; he bore high Spirits, and shined far out of Obscurity.

18

The Popes of Rome, are in Number to this Day, two hundred forty and one: Of so great a Number, five onely have attained to the age of four-score years, or upwards. But in many of the first Popes, their full age was intercepted by the prerogative and crown of Martyrdome. *John* the twenty third, Pope of Rome, fulfilled the ninetieth year of his age: A man of an unquiet Disposition, and one that studied Novelty: He altered many Things, some to the Better, others onely to the New; a great accumulator of Riches and Treasures. *Gregory*, called the twelfth, created in Schisme, and not fully acknowledged Pope, died at ninety years. Of him, in respect of his short Papacy, we finde nothing, to make a judgement upon. *Paul* the third, lived eighty years and one: a temperate man, and of a profound wisdom; he was Learned, an Astrologer, and one that tended his health carefully: But after the example of old *Eli* the Priest, over-Indulgent to his Family. *Paul* the fourth, attained to the age of eighty three years: a man of an Harsh nature, and severe; of an haughty Minde, and Imperious; prone to anger; his speech was Eloquent, and Ready. *Gregory* the thirteenth, fulfilled the like age, of eighty three years: an absolute good man: Sound in Minde, and Body: Poltrick, Temperate, full of good works, and an almes-giver.

19

Those that follow are to be more promiscuous in their order; More doubtful in their Faith, and more barren of Observation. King *Arganthonius*, who reigned at *Cades* in Spain,

Spain, lived an hundred and thirty; Or, (as some would have it,) an hundred and forty yeares; Of which he reigned eighty. Concerning his Manners, Institution of his Life, and the time wherein he reigned, there is a general Silence. *Cyrus*, King of *Cyprus*, Living in the *Island*, then termed the *Happy and Pleasant Island*, is affirmed to have attained to an hundred and fifty, or sixty yeares. Two *Latine Kings in Italy*, the *Father*, and the *Sonne*, are reported to have lived, the one eight hundred, the other six hundred yeares: But this is delivered unto us by certaine *Philologists*; Who though otherwise credulous enough; yet themselves have suspected the Truth of this Matter, or rather condemned it. Others record some *Arcadian Kings* to have lived three hundred yeares: The countrey, no doubt, is a place apt for long life; But the Relation I suspect to be fabulous. They tell of one *Dando*, in *Illyrium*; That lived, without the Inconveniencies of old Age, to five hundred yeares. They tell also of the *Epians*, a Part of *Aetolia*; That the whole Nation of them were exceeding long liv'd; Infomuch, that many of them were two hundred yeares old: And that one principal Man amongst them named *Litorius*, a Man of a Giant-like Stature, could have told three hundred yeares. It is recorded that in the top of the *Mountaine Tmolus*, anciently called *Tempsis*, many of the Inhabitants lived to an hundred and fifty yeares. We read that the *Señt* of the *Essians*, amongst the *Jews*, did usually extend their Life to an hundred yeares: Now that *Señt* used a single, or Abstemious Diet; After the Rule of *Pythagoras*. *Apollonius Tyanens* exceeded an hundred yeares; His Face bewraying no such Age; He was an admirable Man; Of the *Heathens* reputed to have something Divine in him; Of the *Christians*, held for a Sorcerer; In his Diet *Pythagorical*; A great Traveller; Much Renowned; And by some adored as a *God*: Notwithstanding, towards the end of his life, he was subject to many Complaints against him, and Reproaches; All which he made shift to escape. But lest his long Life should be impured to his *Pythagorick* Diet, and not rather that it was Hereditary, his *Grand-father* before him, lived an hundred and thirty yeares. It is undoubted, that *Quintus Metellus* lived above an hundred yeares; And that after severall *Consulships* happily admittied; In his old Age he was made *Pontifex Maximus*; And exercised those Holy Duties full two and twentie yeares; In the performance of which Rites, his Voice never failed, nor his hand trembled. It is most certaine, that *Appius Cæcus* was very old; but his yeares are not extant; The most part whereof he passed, after he was Blind; Yet this Misfortune no whit softened him, but that he was able to govern a numerous Family, a great Retinue, and Dependance, yea, even the Common-wealth itselfe, with great Soutnesse. In his extreme old age, he was brought in a Litter into the *Senate-house*; and vehemently disswaded the Peace with *Pyrrhus*: The beginning of his Oration was very Memorable, the being an Invincible Spirit, and Strength of Minde; *I have, with great griefe of Minde, (Fathers Conscrip't.) these many yeares borne my Blindnesse; but now I could wish that I were Deafe also: when I hear you speak to such dishonourable Treaties.* *Marcus Perperna* lived ninety eight yeares; Surviving all those, whose Suffrages he had gathered, in the *Senate-House*, being *Consul*; I mean, all the *Senators* at that time: As also all those whom a little after, being *Consul*, he chose into the *Senate*; Seven onely being excepted. *Hiero*, King of *Sicily*, in the time of the second *Punick Warre*, Lived almost an hundred yeares; A man Moderate, both in his Government, and in his Life: A Worshipper of the *Gods*, and a Religious conferver of Friendship; Liberal, and constantly Fortunate, *Statilia*, descended of a Noble Family, in the dayes of *Claudius*, lived ninety nine yeares. *Clodia*, the Daughter of *Osilius*, an hundred and fifteen. *Xenophilus*, an Ancient Philosopher, of the Sect of *Pythagoras*, attained to an hundred and six yeares: Remaining healthfull, and vigorous in his old Age; And famous amongst the Vulgar, for his Learning. The *Islanders of Corcyra*, were anciently accounted Long liv'd; But now they live after the rate of other Men. *Hypocrates Cous*, the Famous *Physician*, lived an hundred and four yeares; And approved, and credited his own Art, by so long a life: A Man, that coupled learning and wisdom together; Very conversant in Experience and Observation: One that hunted not after Words or Methods; But severed the very Nerves of Science, and so propounded them. *Demonax*, a Philosopher, not onely in Profession, but Practice, lived in the dayes of *Adrian*, almost to an Hundred yeares: A Man of an high Minde, and a Vanquisher of his own Minde; And that, truly, and without Affectation; A Contemner of the World, and yet Civil and Courteous: When his Friends spake to him, about his Burial, he said; *Take no Care for my Burial; For Stench will bury a Carcase*: They replied; *Is it your*

Mind then to be cast out to Birds, and Dogs? He said againe, Seeing, in my life time, I endeavoured to my uttermost, to benefit Men, what hurt is it, if, when I am dead, I benefit beasts? Certain Indian People, called Pandora, are exceedingly long-liv'd; Even to no lesse than two hundred yeares. They adde a thing more Maivellous; That having when they are boyes, an Haire, somewhat whitish; In their old age, before their gray haire, they grow coal black: Though indeed this be every where to be seen; that they which have white Haire, whilest they are Boyes, in their Mans estate, charge their Haire into a Darker colour. The Seres, another People of India, with their Wine of Palmes, are accounted Long-Livers; Even to an hundred and thirty yeares. Euphranor, the Grammarian, grew old in his School; And taught Scholars, when he was above an hundred yeares old. The Elder Ovid, Father to the Poet, lived Ninety yeares: Differing much from the disposition of his Sonne; For he contemned the Muses, and dissuaded his Sonne from Poetry. Asinius Apollio, intimate with Augustus, exceeded the Age of an hundred yeares; A Man of an unreasonable Profusenesse, Eloquent, a Lover of Learning; But Vehement, Proud, Cruel; And one that made his Private Ends the Center of his Thoughts. There was an Opinion, that Seneca, was an extream Old Man; No lesse than an Hundred, and fourteen yeares of Age: which could not possibly be; It being as improbable, that a Decrepid old Man, should be set over Neroe's Youth; As, on the contrary, it was true, that he was able to mannage, with great Dexterity, the affaires of State: Besides, a little before, in the midt of Claudius his Reigne, he was banished Rome, for Adulteries committed with some Noble Ladies; which was a Crime, no way competible with fo extream old Age. Johannes de Temporibus, among all the men of our latter Ages; out of a common Fame, and Vulgar Opinion, was reputed Long-liv'd, even to a miracle; Or rather, even to a Fable; His Age hath been counted, above three Hundred yeares: He was by Nation a French Man; And followed the Wartes, under Charles, the Great. Gartius Aretine, Great Grand-Father to Petrarch, arrived at the Age of an hundred four yeares. He had ever enjoyed the Benefit of good Health; Besides, at the last, he felt rather a Decay of his Strength, than any Sicknesse, or Malady; which is the true Resolution, by old Age. Amongst the Venetians, there have been found, not a few long Livers; and those of the more eminent sort: Franciscus Donatus, Duke; Thomas Contareus, Procurator also of Saint Mark; Franciscus Nolinus, Procurator also of Saint Mark; Others; But most Memorable, is that of Cornarus the Venetian, who being in his youth of a sickly Body; beganne first to eat and drink by measure to a certaine weight; Thereby to recover his Health; This Cure, turned, by use into a Diet; That Diet to an extraordinary long Life; Even of an 100 yeares and better, without any Decay in his Senses; And with a constant enjoying of his Health. In our age William Postel, a French Man, lived to an hundred, and well nigh twenty yeares: The top of his Beard on the upper lip, being black, and not grey at all: A man crazed in his Brain, and of a Fancy not altogether sound; A great Traveller, Mathematician, and somewhat stained with Heresie.

20 I suppose there is scarce a Village, with us in England, if it be any white populous, but it affords some Man or Woman of fourscore yeares of age; Nay, a few yeares since, there was in the County of Hereford, a May-game, or Morris-Dance, consisting of Eight Men, whose Age computed together, made up eight hundred yeares; Inso-much, that what some of them wanted of an hundred, others exceeded as much.

21 In the Hospital of Bethleem, corruptly called Bedlam; in the Suburbs of London, there are found, from time to time, many Mad Persons that live to a great Age.

22 The Ages of Nymphs, Fawns, and Satyrs, whom they make to be, indeed Mortal, but yet exceedingly Long-liv'd; (A Thing, which Ancient Superstition, and the late Credulity of some, have admitted;) we account but for Fables and Dreames: Especially, being that, which hath neither consent with Philosophy, nor with Divinity. And as touching the History of Long Life in Man, by Individuals, or next unto Individuals, thus much: Now we will passe on to Observations, by certaine Heads.

23 The Running on of Ages, and Succession of Generations, seem to have no whit abated from the length of Life: For we see, that from the time of Moses, unto these our Dayes, the term of Mans life hath stood about Fourscore yeares of Age; Neither hath it declined (As a man would have thought) by little and little. No doubt, there are Times, in every Countrey, wherein men are longer, or shorter liv'd.

Longer,

Longer, for the most part, when the times are barbarous, and Men fare lesse deliciously, and are more given to bodily Exercises: Shorter, when the times are more Civil, and Men abandon themselves to Luxury and Ease. But these things passe on by their turnes: The Succession of Generations alters it not. The same, no doubt, is in other living Creatures: For neither Oxen, nor Horses, nor Sheep, nor any the like, are abridged of their wonted Ages at this day. And therefore the Great Abridger of Age was the *Flood*: And perhaps, some such notable Accidents; (As particular *In-undations*, *Long Droughts*, *Earth-quake*s, or the like, may doe the same again. And the like reason is, in the Dimension and Stature of Bodies; For neither are they lessened by succession of Generations; Howsoever *Virgil* (following the vulgar Opinion) Divined, that After-ages would bring forth lesser Bodies, than the then present: whereupon speaking of plowing up the *Emathian*, and *Emonensian* Fields, He saith, *Grandiaq; effissis mirabuntur ossis sepulchris: That after ages shall admire the great bones digged up in ancient Sepulchres.* For whereas it is manifested that there were heretofore men of Gigantic Statures, (such as for certain, have been found in *Sicily*, and elf-where, in ancient Sepulchres, and Caves,) yet within these last three thousand yeares: A time, whereof we have sure memory: Those very Places have produced none such: Although this Thing also hath certaine Turns and Changes, by the Civillizing of a Nation, no lesse than the former. And this is the rather to be noted, because men are wholly carried away with an Opinion: That there is a continual Decay by succession of Ages, as well in the Term of mans life, as in the Stature and strength of his Body: And that all things decline, and change to the worse.

In *Cold*, and *Northern Countries*, Men live longer, commonly, than in *Hot*: which must needs be, in respect: The Skinne is more compact and close: And the Juices of the body lesse dissipable: And the Spirits themselves lesse Eager to consume, and in better disposition to repaire; And the aire, (as being little heated by the Sun-beams) lesse Predatory: And yet, under the *Aequinoctial Line*, where the Sunne passeth to and fro, and causeth a double Summer, and double Winter: And where the Dayes and Nights are more Equal: (If other Things be concurring,) they live also very long: As in *Pern*, and *Taprobane*.

Islanders are, for the most part, longer liv'd, than those that live in *Continents*: For they live not so long in *Russia*, as in the *Orcades*: Nor so long in *Africa*, though under the same *Parallel*, as in the *Canaries*, and *Tercera's*: And the *Japonians*, are longer liv'd, than the *Chineses*: Though the *Chineses* are made upon Long life. And this thing is no mervaile: Seeing the Aire of the Sea doth heat and cherish in cooler Regions, and coole in hotter.

High Situations, doe rather afford long Livers, than *Low*; Especially, if they be not *Tops of Mountaines*, but *Rising Grounds*, as to their general Situations; Such as was *Arcadia in Greece*; And that part of *Aetolia*, where we related them, to have lived so long. Now there would be the same Reason, for *Mountaines* themselves, because of the purenesse and clearenesse of the Aire, but that they are corrupted by accident: Namely, by the Vapours, Rising thither out of the Vallies, and Resting there. And therefore in *Snowy Mountains*, where is not found any Notable long Life; Nor in the *Alps*, nor in *Pyrenean Mountains*, nor in the *Appenine*: Yet in the tops of the *Mountaines*, running along towards *Ethiopia*, and the *Abyssines*; where by reason of the Sands beneath, little or no Vapour riseth to the *Mountaines*, they live long, even at this very Day; Attaining, many times, to an hundred and fifty yeares.

Marshes, and *Fens*, are Propitious to the Natives, and Malignant to Strangers, as touching the Lengthning, and Shortning of their lives: And that which may seem more Marvellous, *Salt Marshes*, where the Sea ebbs and flows, are lesse wholsome than those of Fresh water.

The *Countries*, which have been observed, to produce long Livers, are these; *Arcadia*, *Aetolia*, *India*, on this side *Ganges*, *Brazil*, *Taprobane*, *Britaine*, *Ireland*, with the Islands of the *Orcades*, and *Hebrides*: For as for *Ethiopia*, which by one of the Ancients, is reported to bring forth long Livers; It is but a Toy.

It is a Secret; The *Healthfulnesse of Aire*, especially in any Perfection, is better found by *Experiment*, than by *Discourse*, or *Conjecture*. You may make a Trial by a lock of *Wool*, exposed, for a few dayes, in the open Aire, if the weight be not much increased:

increased: Another by a piece of Flesh, exposed likewise; If it corrupt not over-soon: Another by a Weather-Glasse: If the Water interchange not too suddenly. Of these and the like enquire further.

30 Not only the *Goodness*, or *Pureness* of the *Aire*, but also the *Equality* of the *Aire*, is Material to Long Life. Inter-mixture of Hills and Dales, is pleasant to the sight, but suspected for Long Life. A Plaine, moderately dry; But yet not over-barren, or Sandy; nor altogether without Trees, and Shade; Is very convenient for Length of Life.

31 *In-equality* of *Aire*, (as was even now said;) in the Place of our Dwelling, is naught: But *Change* of *Aire* by Travelling, after one be used unto it, is good: And therefore great Travellers have been Long Liv'd. Also those that have lived perpetually in a little Cottage, in the same place, have been long-livers: For aire accustomed, containeth lesse; but aire changed, nourisheth, and repaireth more.

32 As the Continuation, and Number of Successions, (which we said before,) makes nothing to the Length or Shortness of Life; So the *Im-mediate Condition* of the *Parents*, as well the Father, as the Mother, without doubt, availeth much. For some are begotten of old Men, some of Young Men, some of Men of Middle-age, again, some are begotten of Fathers Healthfull, and well Disposed; Others of Diseased and languishing; Again, some of Fathers, immediately after Repletion, or when they are Drunke; Others, after Sleeping, or in the Morning: againe, some after a long Intermission of *Venus*; Others upon the act repeated: againe, some in the Feivency of the Fathers love, (as it is commonly in Bastards;) Others after the Cooling of it, as in long Married Couples. The same things may be considered on the part of the Mother: Unto which must be added, the Condition of the Mother; whilest she is with child, as touching her Health; as touching her Diet: The time of her Bearing in the Womb; To the tenth Moneth, or earlier. To reduce these things to a Rule, how farre they may concerne *Long Life*, is hard: and so much the Harder, for that those things, which a Man would conceive to be the best, will fall out to the contrary: For that Alacrity in the Generation, which begets Lusty and Lively Children, will be lesse profitable to long-life, because of the Acrimony, and Inflamming of the Spirits. We said before; That to partake more of the Mothers Bloud, conduceth to Long Life. Also, we suppose all things in Moderation, to be best; Rather Conjugal Love, then Meretricious; The hour for Generation to be the morning; a state of body, not too lusty, or full; and such like. It ought to be well observed; That a strong Constitution in the parents, is rather good for them, than for the Childe; Especially in the Mother, And therefore *Plato* thought, ignorantly enough; That the vertue of Generations halted, because the woman used not the same Exercise, both of Minde and Body, with the men: The contrarie is rather true; For the Difference of vertue, betwixt the Male, and the Female, is most profitable for the Childe; and the Thinner women, yeeld more towards the Nourishment of the Childe; which also holds in Nurfes. Neither did the *Spartan women*, which married not before twenty two, or as some say, twenty five; (and therefore were called *Man-like women*;) bring forth a more Generous, or long liv'd Progenie; Than the *Roman* or *Athenian*, or *Theban women*, did, which were ripe for Marriage, at twelve, or fourteen yeares. And if there were any thing eminent in the *Spartans*; That was rather to be imputed, to the Parsimony of their Diet, than to the late Marriages of their women. But this we are taught by experience; That there are some Races, which are long-liv'd, for a few Decents; so that life, is like some Diseases, a Thing Hereditarie. within certaine Bounds.

33 *Faire* in *Face*, or *Skin*, or *Haire*, are shorter Livers; *Black*, or *Red*, or *Freckled*, longer. Also too Fresh a Colour in youth, doth lesse promise long life, than Paleness. *A hard skin*, is a signe of long life, rather then a Soft: But we understand not this of a Rugged Skin, such as they call the goose skin, which is, as it were spongie, but of that which is hard, and Close. *A Fore-head* with deep Furrows and Wrinkles is a better signe, than a smooth and plain Fore-head.

34 The *Haires* of the *Head* hard, and like Bristles, doe betoken longer life, than those that are soft, and Delicate. *Curled Haires* betoken the same thing, if they be Hard withal; But the Contrarie, if they be Soft and shining. The like, if the curling be rather thick, than in large Bunches.

35 Early, or late, *Baldness*, is an indifferent Thing; Seeing many which have been

Bald betimes, have lived long. Also early *Gray Hairs*, (Howsoever they may seem Fore-runners of Old age approaching,) are no sure signes; For many that have grown *gray* betimes, have lived to great years. Nay, *Hasty Gray Hairs*, without *Baldness*, is a Token of long Life; contrarily, if they be accompanied with *Baldness*.

Hairiness of the upper parts, is a signe of short life; and they that have extraordinary much *Haire* on their Breasts, live not long; but *Hairiness* of the Lower parts, as of the Thighes, and Legs, is a signe of long life.

Tallness of *Stature*, (if it be not Immoderate,) with convenient making, and not too slender; Especially if the body be active withall; Is a signe of long-life. Also on the contrary, Men of low stature live long, if they be not too active, and stirring.

In the proportion of the body; They which are *short* to the *Waistes*, with long legs, are longer liv'd than they, which are *long* to the *Waistes*, and have short Legs: Also they which are large in the Nether parts, and streight in the upper; (The making of their Body, rising, as it were, into a sharp Figure,) are longer liv'd than they, that have broad Shoulders, and are slender down-wards.

Leanness, where the affections are settled, calme, and peaceable; Also a more *Fat habit of Body*, joynd with *Choler*, and a Disposition stirring, and peremptory, signifie long-life: But *Corpulency* in youth, fore-shews short life; In Age it is a thing more Indifferent.

To be *Long*, and *Slow*, in *Growing*, is a signe of long-life; If to a Greater Stature, the Greater signe; If to a lesser Stature, yet a signe though; contrarily, to *grow* quickly to a great stature, is an evill signe; If to a small stature, the lesse evill.

Firme Flesh; A Raw-bone body, and veins lying higher than the flesh, betoken long life: The contrary to these, short Life.

A *Head* some-what lesser than to the proportion of the Body; A moderate *Necke*, not long, nor slender, nor fat, nor too short, wide *Nostrils*, whatsoever the form of the Nose be, a large *Mouth*; an *Eare* Griftly, not Fleshy; *Teeth* strong, and contiguous, small, or thin-set, fore-token long-life: And much more, if some new *Teeth* put forth in our elder years.

A broad *Breast*, yet not bearing out, but rather bending inwards; *Shoulders* somewhat crooked, and (as they call such persons) round-back'd; a *Flat Belly*; a *Hand* large, and with few lines in the *Palme*; a short, and round *Foot*; *Thighes* not Fleshy, and *Calves* of the *Leg* not hanging over, but neat, are signes of long-life.

Eyes some-what large, and the *Circle* of them inclined to Greenesse; *Senses* not too quick: The *pulse* in youth slower, towards old age quicker, *Facility* of holding the *Breath*, and longer than usual; the body in youth inclined to be bound, in the Decline of years more Laxative, are all signes of long-life.

Concerning the *Times* of *Nativity*, as they refer to long-life, nothing hath been observed worthy the setting down; save onely *Astrological Observations*, which we rejected in our *Topicks*. A *Birth* at the eighth Moneth, is not onely long-liv'd, but not likely to live. Also *winter-Births* are accounted the longer liv'd.

A *Pythagomcal*, or *Monastical Diet*; according to strict rules, and always exactly Equal, (as that of *Cornarus* was) seemeth to be very effectual for long-life. Yet on the contrary, amongst those that live freely, and after the common sort, such as have good *Stomacks*, and feed more plentifully, are often the longest-liv'd. The *Middle diet*, which we account the Temperate, is commended, and conduceth to good Health, but not to long life; For the *Spare Diet* begets few *Spirits*, and dull; and so wasteth the body lesse; and the *Liberal Diet* yeeldeth more ample nourishment, and so repaireth more; But the *Middle Diet*, doth neither of both; for where the extreames are hurtful, there the Meane is best: But where the Extreames are helpful, there the Mean is nothing worth.

Now to that *Spare Diet*, there are *Requisite*, *Watching*, lest the *Spirits* being few, should be oppressed with much sleep; *Little Exercise*, lest they should exhale; *Abstinence* from *Venerie*, lest they should be exhausted: But to the *Liberal diet*, on the other side, are *Requisite*, *Much Sleep*, *frequent Exercises*, and a seasonable use of *Venerie*. *Baths*, and *Anoiments*, (such as were anciently in use,) did rather tend to Delicousnesse, than to prolonging of life. But of all these things, we shall speak more exactly, when we come to the *Inquisition*, according to *Intentions*. Mean-while that of *Celsus*, who was not onely a *Learned Physician*, but a wise man, is not to be omitted; Who adviseth Inter-changing, and Alternation of the *Diet*, but still with an Inclination to the more Benigne: as that a man should sometimes accustom himself to watching

watching, sometimes to sleep; But to sleep oftneft: again, that he should sometimes give himself to fasting, sometimes to feasting; But to feasting oftneft: That he should sometimes in-use himself to great Labours of the Minde, sometimes to Relaxations of the same, but to Relaxations oftneft. Certainly, this is without all question, That *Diet* well ordered bears the greatest part, in the Prolongation of life; Neither did I ever meet an extream long-liv'd man; But being asked of his course, he observed some thing peculiar; some one Thing, some another. I remember an *old Man*, above an hundred yeares of Age, who was produced as a witnesse, touching an ancient Prescription; when he had finished his Testimony, the *Judge* familiarly asked him, How he came to live so long; He answered, beside Expectation, and not without the Laughter of the Hearers; *By Eating before I was Hungry, and Drinking before I was Drie*. But of these things we shall speak hereafter.

47

A *Life* led in Religion, and in *Holy Exercises*, seemeth to conduce to long life. There are in this kinde of life, these things; Leisure, Admiration and Contemplation of heavenly things; Joies not sensual; Noble Hopes; Wholsome Fears; Sweet Sorrows; Lastly, continual Renovations, by Observances, Penances, Expiations; All which are very powerful to the Prolongation of life. Unto which if you adde that austere Diet, which hardeneth the Masse of the Body, and humbleth the Spirits, no marvel, if an extraordinary length of life do follow; such as was that of *Paul* the *Hermite*, *Simeon Stilet* and the *Columnar Anchorite*; and of many other *Hermites* and *Anchorites*.

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Next unto this, is the life led in good letters; Such as was that of Philosophers, Rhetoricians, Grammarians. This life is also led in leisure; And in those thoughts, which seeing they are severed from the affairs of the world, bite not; But rather delight through their Variety, and Impertinency. They live also at their pleasure; Spending their time in such Things, as like them best; and for the most part in the company of young men; which is ever the most cheerful. But in Philosophies, there is great Difference betwixt the sects, as touching long life. For those Philosophies, which have in them a touch of Superstition, and are conversant in high Contemplations, are the best; As the Pythagorical, and Platonick: Also those, which did institute a perambulation of the world, and considered the Variety of Natural things; and had Reachless, and High, and Magnanimous Thoughts, (as of *Infinity*, of the Stars, of the Heroical Vertues, and such like;) were good for lengthening of life; such were those of *Democritus*, *Philolaus*, *Xenophanes*, the Astrologians, and Stoicks: Also those, which had no profound speculation in them; but discoursed calmly on both sides, out of common sense, and the Received Opinions, without any sharp Inquisitions were likewise Good; Such were those of *Carnepades*, and the *Academicks*; also of the Rhetoricians, and Grammarians. But contrarily, Philosophies conversant in perplexing subtilties; and which pronounced peremptorily; and which examined and wrested all things, to the Scale of Principles; Lastly, which were Thorny and Narrow, were Evil; such were those commonly of the Peripateticks, and of the School-men.

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The *Counrey Life*, also, is well fitted, for long life: It is much abroad, and in the open Aire; It is not slothful; but ever in Employment: It feedeth upon Fresh Cares, and un-bought: It is without Cares, and Envy.

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For the *Militar Life*, we have a good opinion of that whilst a man is young: Certainly, many excellent *Warriers* have been long liv'd; *Covinus*, *Camsillus*, *Xenophon*, *Agesslaus*; with others, both ancient, and Modern: No doubt, it furthereth long life, to have all things from our youth, to our Elder age, Mend and grow to the better; That a youth full of Crosses may minister sweetnesse to our Old Age. We conceive also, that *Militar Affections*, inflamed with a Desire of Fighting, and Hope of Victory, do infuse such a Heat into the *Spirits*, as may be profitable for long life.

Medicines

Medicines for Long Life.

To the tenth Article.

THe Art of Physick, which we now have, looks no further, commonly, than to Conservation of Health, and Cure of Diseases: As for those things which tend properly to Long Life, there is but slight mention, and by the way onely. Norwithstanding we will propound those Medicines, which are notable in this kinde, I mean, those which are Cordials. For it is consonant to Reason, that those things, which being taken in Cures, do defend and fortifie the Heart; or, more truly, the Spirits, against Poisons, and Diseases; being transferred with judgement and choice, into Diet, should have a good effect, in sort, towards the Prolonging of Life. This we will do, not heaping them promiscuously together (as the manner is) but selecting the best.

Gold is given in 3 forms, either in that which they call *Aurum potable*; or in Wine wherein Gold hath been quenched; or in gold in the substance, such as are *Leafe Gold*, and the *Filings of Gold*. As for *Aurum potable*, it is used to be given in desperate or dangerous Diseases; and that not without good successe. But we suppose that the Spirits of the *Salt*, by which the *Gold* is dissolved, do rather minister that vertue, which is found in it, than the *Gold* it selfe; though this secret be wholly suppressed. Now if the body of *Gold* could be opened, without these *Corrosive waters*, or by these *Corrosive waters*, (so the venomous quality were wanting) well washed, we conceive it would be no unprofitable medicine.

Pearls are taken either in a fine powder, or in a certain Masse, or Dissolution, by the juice of sower and new Limons: And they are given sometimes in Aromatical Confections, sometimes in Liquor. The *Pearle*, no doubt, hath some affinity with the Shell, in which it groweth, and may be of the same quality with the Shells of *Crey-fishes*.

Amongst the *Transparent precious Stones*, two onely are accounted *Cordial*; The *Emerauld* and the *Jacinth*; which are given under the same forms, that the *Pearls* are; save onely that the dissolutions of them, as far as we know, are not in use. But we suspect these *Glassie Jewels*, lest they should be cutting.

Of these which we have mentioned, how far, and in what manner they are helpfull, shall be spoken hereafter.

Bezoar Stone is of approved vertue, for refreshing the Spirits, and procuring a gentle Sweat. As for the *Vnicorns Horn*, it hath lost the credit with us; yet so, as it may keep Rank with *Harts Horns*; and the *Bone* in the heart of a *Hart*, and *Ivory*, and such like.

Amber Grise, is one of the best to appease and comfort the Spirits.

Hereafter follow the Names onely of the *Simple Cordials*, seeing their Vertues are sufficiently known.

Hot.	Hot.	Cold.	Cold.
Saffron.	Clove Gillyflowers	Nitre.	Juice of sweet
Folium Indum.	Orange Flowers.	Roses. Violets.	Oranges.
Lignum Aloes.	Rosemary.	Strawberry-	Juice of Pearmains.
Citron Pill, or	Mint.	leaves.	Borage.
Rinde.	Betony.	Strawberries.	Buglosse.
Balme.	Carduus Benedi-	Juice of sweet	Burnet. Sanders.
Basil.	ctus.	Limous.	Camphire.

Seeing our speech now is of those things, which may be transferred into Diet; All Hot waters, and Chimmical Oiles; (which, as a certain Trifler saith, are under the Planet Mars; and have a Furious and Destructive Force;) As also, all hot, and biting Spiées are to be rejected: and a Consideration to be had, how Waters and Liguours may be made of the Former simples; not those Phlegmatick distilled waters; Nor again those burning waters of Spirits of Wine: But such as may be more temperate, and yet lively, and sending forth a Benigne Vapour.

I make some question touching the frequent letting of Blood, whether it conduceth to long life, or no; and I am rather in the opinion that it doth, if it be turned into a Habit, and other things be well disposed: For it letteth out the old Juice of the Body, and bringeth in new.

I suppose also, that some *Emaciating Diseases*, well cured, do profit to long life; For they yield new Juice, the old being consumed; And, (as he saith,) *To recover a sickness, is to renew youth*: Therefore it were good to make some *Artificial Diseases*; which is done by strict, and *Emaciating Diets*; Of which I shall speak hereafter.

The Intentions.

To the 12,
13, & 14,
Articles.

HAVING finished the Inquisition, according to the Subjects: As Namely, of Inanimate Bodies, Vegetables, Living Creatures, Man; I will now come nearer to the Matter, and order mine Inquisition by certain Intentions; Such as are true, and proper, (as I am wholly perswaded;) And which are the very paths to Mortal Life. For in this part, Nothing that is of worth hath hitherto been enquired; But the Contemplations of Men have been, but simple, and non-proficients. For when I heare Men, on the one side, speak of Comforting Natural Heat, and the Radical Moisture; And of Meats, which breed good Blood; Such as may neither be Burnt, nor Phlegmatick; And of the Cheering and Recreating the Spirits; I suppose them to be no bad Men, which speak these Things: But none of these worketh effectually towards the end. But when, on the other side, I heare several Discourses, touching Medicines made of Gold, because Gold is not subject to Corruption: And touching Precious Stones, to refresh the Spirits by their hidden Properties and Lustre: And that, if they could be taken, and retained in Vessels, the Balsomes, and Quint-essences of Living Creatures, would make Men conceive a proud hope of Immortality: And that the Flesh of Serpents, and Harts, by a certain consent, are powerful to the Renovation of Life; Because the one casteth his Skin, the other his Horns; (They should also have added the Flesh of Eagles, because the Eagle changes his Bill:) And that a certain Man, when he had found an Ointment hidden under the Ground, and had anointed himself there-with from Head to Foot, (excepting onely the soles of the Feet) Did, by his anointing, live three hundred yeares, without any Disease; save onely some Tumours in the soles of his Feet: And of Artesius, who when he found his Spirit ready to depart, drew into his Body the Spirit of a certain young man; and thereby made him Breathlesse; But himself lived many yeares by another Mans Spirit: And of Fortunate Hours, according to the Figures of Heaven, in which Medicines are to be gathered, and compounded for the prolongation of Life: And of the Scales of Planets, by which Vertues may be drawn, and fetched down from Heaven, to prolong Life: And such like fabulons, and superstitious Vanities: I wonder exceedingly, that men should so much dote, as to suffer themselves to be deluded with these Things. And again, I do pity Man-kinde; That they should have the hard Fortune, to be besieged with such frivolous, and senseless Apprehensions. But mine Intentions do both come home to the Matter; And are farre from vain and credulous Imaginations: Being also such, as I conceive, Posterity may adde much to the Matters, which satisfy these Intentions: But to the Intentions themselves, but a little. Notwithstanding there are a few Things, and those of very great Moment, of which I would have Men to be fore-warned.

First, we are of that Opinion, that we esteem the Offices of Life, to be more worthy than Life it selfe. Therefore, if there be any Thing of that kinde, that may indeed exactly answer our Intentions, yet so, that the Offices and Duties of Life, be thereby hindered; Whatsoever it be of this kinde, we reject it. Perhaps, we may make some light Mention of such things, but we insist not upon them. For we make no serious, nor diligent Discourse; Either of leading the life in Caves, where the Sun-beams, and severall changes of the Aire, pierce not; Like Epimenides his Cave; Or of perpetual Baths, made of Liquors prepared; Or of Shirts, and Sear-cloaths, so applied, that the Body should be alwayes, as it were, in a Box; Or of thick paintings of the Body, after the manner of some Barbarous Nations; Or of an exact ordering of our Life, & Diet, which aimeth onely at this, and mendeth nothing else, but that a Man live; (As was that of Herodicus, amongst the Ancients: And of Cornarus the Venetian; in our dayes, but with greater Moderation;) Or of any such Prodigie, Tedioussesse, or Inconvenience: But we propound such Remedies, and Precepts, by which the Offices of Life, may neither be deserted, nor receive any great Interruptions, or Molestations.

Secondly,

Secondly, on the other side, we denounce unto Men, that they will give over trisling: And not imagine, that so great a worke, as the stopping, and turning back, the powerful Course of Nature, can be brought to passe by some Morning Draught, or the taking of some precious Drug; But that they would be assured, that it must needs be, that this is a work of labour; And consisteth of many remedies, and a fit connexion of them amongst themselves; For no man can be so stupid, as to imagine, that what was never yet done, can be done; but by such wayes, as were never yet attempted.

Thirdly, we ingenuously professe, That some of those things, which we shall propound, have not been tried by us, by way of experiment; (For our course of life doth not permit that;) But are derived (as we suppose) upon good reason, out of our Principles and Grounds; (of which some we set down, others we reserve in our Minde,) And are, as it were, cut, and digged out of the Rock, and Mine of Nature Her self. Nevertheless, we have been careful, and that with all providence and Circumspection; (Seeing the Scripture saith of the Body of Man, That it is more worth than Raiment;) To propound such Remedies, as may at least be safe, if peradventure they be not Fruifull.

Fourthly, we would have men rightly to observe, and distinguish; That those things which are good for an Healthful Life, are not always good for a Long Life. For there are some things which do further the Alacrity of the Spirits, and the Strength and Vigour of the Functions, which, notwithstanding, do cut off from the sum of Life: And there are other Things, which are profitable to Prolongation of Life; which are not without some Perill of Health, unlesse this Matter be salved by fit Remedies: Of which, notwithstanding, as occasion shall be offered, we will not omit, to give some Cautions, and Monitions.

Lastly, we have thought good to propound sundry Remedies, according to the severall Intentions; But the choice of those Remedies, and the Order of them, to leave to Discretion, For to set down exactly, which of them agreeth best, with which Constitution of Body, which with the severall Courses of Life; which with each Mans particular Age; And how they are to be taken, one after another; and how the whole Practique of these Things is to be administr'd and governed, would both be too long, neither is it fit to be published.

In the Topicks, we propounded three Intentions. The Prohibiting of Consumption; The Perfecting of Reparation; And the Renewing of Oldness. But seeing those things which shall be said, are nothing lesse than words, We will deduce these three Intentions, to Ten Operations.

- The first is, the Operation upon the Spirits, that they may renew their Vigour. 1
- The second Operation is, upon the Exclusion of Aire. 2
- The third Operation is, upon the Bloud, and the Sanguifying Heat. 3
- The fourth Operation is, upon the Juices of the Body. 4
- The fifth Operation is, upon the Bowels, for their Extrusion of Aliment. 5
- The sixth Operation is, upon the Outward Parts, for their Attraction of Aliment. 6
- The seventh Operation is, upon the Aliment it self, for the Insignation thereof. 7
- The eighth Operation is, upon the last Act of Assimilation. 8
- The ninth Operation is, upon the Inteneration of the Parts, after they begin to be Dried. 9
- The tenth Operation is, upon the Purging away of Old Juice, and Supplying of New Juice. 10

Of these Operations, the four first belong to the First Intention; The four next to the Second Intention; And the two last, to the Third Intention.

But because this Part, touching the Intentions doth tend to Practice; under the Name of History, we will not onely comprise Experiments and Observations; but also Counsels, Remedies, Explications of Causes, Assumptions, and whatsoever hath reference hereunto.

The operation upon the Spirits, that they may remain youthful,
and renew their vigour.

The History.



THE *Spirits* are the Master-workmen of all effects in the *Body*. This is manifest by consent, and by infinite instances.

If any man could procure, that a young mans *Spirit* could be conveyed into an old mans *Body*; it is not unlikely, but this great Wheel of the *Spirits*, might turn about the lesser wheel of the *Parts*, and so the course of Nature become retrograde.

In every Consumption, whether it be by Fire, or by Age, the more the *Spirit* of the *Body*, or the Heat, preyeth upon the *Moysture*, the lesser is the duration of that Thing. This occurs every where, and is manifest.

The *Spirits* are to be put into such a temperament, and degree of activity; That they should not (as He saith) *Drunke*, or *Guzzle* the juices of the *Body*, but *Sip them onely*.

There are two kinde of *Flames*. the one eager and weak, which consumes slight substances, but hath little power over the harder; as the flame of Straw, or small Sticks; The other strong, and constant, which converts hard and obstinate substances, as the flame of hard wood, and such like.

The eager flames, and yet little robust, do dry *Bodies*, and render them exhaust and saplesse; but the stronger flames do intenerate and melt them.

Also, in *Dispersing Medicines*, some vapour forth the thinne part of the tumours, or swellings; and these harden the tumour: Others powerfully dissolve, and these soften it.

Also in *Purging and Absterging Medicines*, some carry away the fluid humours violently; others draw the more obstinate and vitious.

The *Spirits* ought to be invented and armed with such a heat, that they may choose rather to stir and undermine hard and obstinate matters, than to discharge and carry away the thin and prepared: For by that means the *Body* becomes Green and Solid.

The *Spirits* are so to be wrought and tempered, that they may be in Substance, Dense, not Rare; In Heat, strong, not rage; In Quantity, sufficient for the offices of Life, not Redundant, or Turgid; In Motion, appeased, not Dancing, or Unequal.

That *Vapours* work powerfully upon the *Spirits*, it is manifest; by sleep, by drunkenness, by Melancholy passions, by Efficacious Medicines, by Odours, calling the *Spirits* back again, in swoonings and faintings.

The *Spirits* are condensed four wayes; either by putting them to flight, or by refrigerating and cooling them; or by breaking them, or by quieting them. And first of their *Condensation*, by putting them to flight.

Whatsoever putteth to flight on all parts, driveth the body into his Center, and so condenseth.

To the *condensation* of the *Spirits* by flight, the most powerful and effectual, is *Opium*; and next, *Opiates*; and generally, all *Soporiferous things*.

The force of *Opium*, to the *condensation* of the *Spirits*, is exceeding strong; when as perhaps, three grains thereof, will, in a short time, so coagulate the *Spirits*, that they return no more, but are extinguished and become immoveable.

Opium, and the like, put not the *Spirits* to flight, by their coldness; For they have parts manifestly hot; but, on the contrary, cool, by their putting the *Spirits* to flight.

The *Flight* of the *Spirits*, by *Opium*, and *Opiate Medicines*, is best seen by applying the same outwardly; For the *Spirits* straight withdraw themselves, and will return no more; but the part is mortified, and turns to a *Gangrene*.

Opiates, in grievous pains, as in the Stone, or the cutting off of a limb, mitigate pains, most of all, by putting the *Spirits* to flight.

Opiates obtain a good effect from a bad cause; For the *Flight* of the *Spirits* is evil; but the *condensation* of them, through their flight, is good.

The *Grecians* attributed much, both for health, and for prolongation of Life, to *Opiates*; but the *Arabians* much more. Inſomuch that their *Grand Medicines* (which they called, the *Gods Hands*;) had *Opium* for their Baſis, and principal Ingredient; other things being mixed, to abate and correct the noxious qualities thereof: Such were *Treacle*, *Muſhrigate*, and the reſt.

Whatſoever is given with good ſucceſſe, in the curing of *Peſtilential* and *Malignant Diſeaſes*; to ſtop and bridle the *Spirits*, leſt they grow turbulent and tumultuace, may very happily be transferred to the prolongation of life: For one thing is eſſentiall unto both; namely, the *condenſation* of the *Spirits*: Now there is nothing better for that, than *Opiates*.

The *Turkes* ſinde *Opium*, even in a reaſonable good quantity, harmleſſe and comfortable; inſomuch, that they take it before their battel, to excite courage; But to us, unleſſe it be in a very ſmall quantity, and with good Correctives, it is Mortal.

Opium and *Opiates*, are manifeſtly found to excite *Venus*; which ſhews them to have force to corroborate the *Spirits*.

Diſtilled water of wilde Poppy, is given with good ſucceſſe, in *Suſſets*, *Agues*, and divers diſeaſes; which, no doubt, is a temperate kinde of *Opiate*: Neither let any man wonder at the various uſe of it; for that is familiar to *Opiates*, in regard that the *Spirits*, corroborated and condenſed, will liſe up againſt any diſeaſe.

The *Turkes* uſe a kinde of Herb, which they call *Caphe*; which they dry and powder; and then drink it in warm water; which they ſay, doth not a little ſharpen them, both in their Courage, and in their Wits; notwithstanding, if it be taken in a large quantity, it affects, and diſturbs the minde; whereby it is manifeſt, that it is of the ſame nature with *Opiates*.

There is a root much renowned in all the *Eastern parts*, which they call *Betel*; which the *Indians*, and others, uſe to carry in their mouthes, and to champ it: and by that champiſg, they are wonderfully enabled, both to endure labours, and to ave come ſickneſſes, and to the act of carnal Copulation: It ſeems to be a kinde of *Stupeſactive*, becauſe it exceedingly blacks the teeth.

Tobacco, in our Age, is immoderately grown into uſe; and it affects men with a ſecret kinde of delight; inſomuch that they who have once inuied themſelvs unto it, can hardly afterwards leave it: And, no doubt, it hath power to lighten the body, and to ſhake off wearineſſe: Now the vertue of it is commonly thought to be, becauſe it opens the paſſages, and voids humours: But it may more rightly be referred to the *condenſation* of the *Spirits*; for it is a kinde of *Hebaine*, and manifeſtly troubles the Head, as *Opiates* doe.

There are ſometimes *Humours* engendred in the Body, which are, as it were, *Opiate* themſelvs; as it is in ſome kind of *Melancholies*; with which, if a man be affected, it is a ſigne of very long life.

The *Simple Opiates*, (which are alſo call'd *Stupeſactives*) are theſe; *Opium* it ſelſe, which is the juce of *Poppys*, both the *Poppies*, as well in the Herb, as in the Seed; *Hembane*, *Mandrake*, *Hemlock*, *Tobacco*, *Night-hade*.

The compound *Opiates* are, *Treacle*, *Muſhrigate*, *Triſera*, *Ladannum*, *Paracelſi*, *Diaconium*, *Diaſcordium*, *Philonium*, *Pils of Houers-tongue*.

From this which hath been ſaid, certain Deſignations or Counſils may be deduced, for the prolongation of Life, according to the preſent intention; namely, of *condenſing* the *Spirits* by *Opiates*.

Let there be therefore, every year, from Adult years of youth, an *Opiate* diet; let it be taken about the end of *May*; becauſe the *Spirits* in the Summer, are more looſe and attenuated; and there are liſe dangers from cold humours; Let it be ſome *Magiſtrall Opiate*, weaker than thoſe that are commonly in uſe, both in reſpect of a ſmaller quantity of *Opium*, and of a more ſpaciſg mixture of extreame hot things; Let it be taken in the morning, betwixt ſleeps. The fare for that time would be more ſimple, and ſpariſg than ordinary, without Wine, or Spices, or vaporous things: This Medicine to be taken onely each other day, and to be continued for a Fort-night: this Deſignation in our judgement, comes home to the intention.

Opiates alſo may be taken, not onely by the mouth, but alſo by *Fumes*; But the *Fumes* muſt be ſuch, as may not move the expulſive Faculty too ſtrongly, nor force down humours; But onely taken in a Veſt, may work upon the *Spirits* within the brain: And therefore a *Suffumigation* of *Tobacco*, *Lignum*, *Aloes*, *Rosemary-leaves* dried,

dried, and a little *Myrrhe*, infused up in the morning, at the Mouth and Nostrils, would be very good.

34 In *Grand Opiates*, such as are *Treacle*, *Methridate*, and the rest; it would not be a misse (especially in youth) to take rather the *distilled Waters* of them, than themselves, in their Bodies: For the vapour, in distilling, doth rise; but the heat of the Medicine commonly scleth. Now *distilled Waters* are good in thole vertues, which are conveyed by Vapours; in other things but weak.

35 There are Medicines, which have a certain weak and hidden degree; And therefore safe; To an *Opiate* Vertue: These send forth a slow and copious vapour, but not Malignant, as *Opiates* doe: therefore they put not the Spirits to *Flight*; Notwithstanding they congregate them, and some-what thicken them.

36 Medicines in order to *Opiates*, are; Principally *Saffron*; next *Folium Indum*, *Amber-Grise*, *Coriander-seed prepared*, *Amomum*, *Penda-momum*, *Lignum Rhodium*, *Orange-Flower water*; and much more the *Infusion* of the same *Flowers* new gathered, in *oile of Almonds*; *Nutmegs* pricked full of holes, and macerated in *Rose-water*.

37 As *Opiates* are to be taken very sparingly, and at certain times, as was said; so these secondaries may be taken familiarly, and in our daily diet; and they will be very effectuall to prolongation of life. Certainly, an *Apothecary of Calecut*, by the use of *Amber*, is said to have lived an hundred and sixty years: And the Noble-men of *Barbary* through the use thereof, are certified to be very long liv'd; whereas the mean people are but of short life. And our *Ancestors*, who were longer liv'd then we, did use *Saffron* much in their Cakes, Broths, and the like. And touching the first way of condensing the Spirits by *Opiates*, and the *Subordinates* thereto, thus much.

38 Now we will enquire of the second way of condensing the Spirits by *Cold*. For the proper work of *Cold* is *Condensation*; and it is done without any malignity, or adverse quality; And therefore it is a safer operation than by *Opiates*, though some-what lesse powerful, if it be done by turns onely, as *Opiates* are. But then again, because it may be used familiarly, and in our daily diet with moderation; it is much more powerful for the prolongation of Life, than by *Opiates*.

39 The *Refrigeration* of the Spirits is effected three wayes; Either by *Respiration*; or by *Vapours*; or by *Aliment*. The first is the best; but, in a sort, out of our power: the second is potent, but yet ready, and at hand; the third is weak, and some-what about.

40 *Aire clear* and *pure*; and which hath no fogginess in it, before it be received into the Lungs; and which is least exposed to the Sun-beams, condenseth the Spirits best. Such is found either on the tops of dry Mountains, or in *Champagnes*, open to the winde, and yet not without some shade.

41 As for the *Refrigeration* and *Condensation* of the Spirits by *Vapours*; the Root of this operation we place in *Nitre*; as a creature purposely made and chosen for this end, being thereunto lead and perswaded by these Arguments.

42 *Nitre* is a kinde of cool Spice: This is apparent to the sense it self; For it bites the Tongue, and Palate, with *Cold*, as Spices do with *Heat*: And it is the onely thing, as far as we know, that hath this property.

43 Almost all *cold things*, (which are cold properly, and not by accident, as *Opium* is) are poor, and jejune, of *Spirit*; Contrarily, things full of *Spirit*, are almost all hot: only *Nitre* is found amongst Vegetables, which aboundeth with *Spirit*, and yet is cold. As for *Camphire*, which is full of spirit, and yet performeth the actions of cold, it cooleth by accident onely; as namely, for that by the thinness thereof, without Acrimony, it helpeth perspiration in inflammations.

44 In *congealing* and *freezing* of *Liquors*; (which is lately grown into use;) by laying Snow and Ice on the out-side of the vessel; *Nitre* is also added; and no doubt it exciteth and fortifieth the *congelation*. It is true, that they use also for this work, ordinary *Bay-Salt*; which doth rather give activity to the coldness of the Snow, than cool by it self: But, as I have heard, in the hotter Regions, where Snow falls not, the congealing is wrought by *Nitre* alone; but this I cannot certainly affirm.

45 It is affirmed, that *Gun-powder*, which consisteth principally of *Nitre*, being taken in drink, doth conduce to valour; and that it is used oftentimes, by Mariners and Souldiers before they begin their batels, as the Turkes do *Opium*.

Nitre is given with good successe, in burning Agues, and pestilential Fevers, to mitigate and bridle their pernicious Heats. 46

It is manifest, that *Nitre* in *Gun-powder* doth mightily abhor the Flame, from whence is cauled that horrible Crack and puffing, 47

Nitre is found to be, as it were, the *Spirit* of the Earth: For this is most certain, That any Earth, though pure and unmixt with *Nitrous* matter, if it be so laid up, and covered, that it be free from the Sun-beams, and putteth forth no Vegetable, will gather *Nitre*, even in good abundance. By which it is clear, that the *Spirit* of *Nitre* is not onely inferiour to the *Spirit* of living Creatures, but also to the *Spirit* of Vegetables. 48

Cattel, which drink of *Nitrous* water, do manifestly grow fat; which is a signe of the cold in *Nitre*. 49

The manuring of the soile is chiefly by *Nitrous* substances; for all dung is *Nitrous*, and this is a signe of the *Spirit* in *Nitre*, 50

From hence it appears, that the *Spirits* of Man, may be cooled and condensed by the *Spirit* of *Nitre*, and be made more Crude, and lesse eager. And therefore, as strong Wines, and Spices, and the like, do burn the *Spirits*, and shorten life: So on the contrary side, *Nitre* doth compose and repress them, and furthereth to life. 51

Nitre may be used with meat, mixed with our Salt, to the tenth part of the Salt; In broths, taken in the morning, from three grains to ten; also in Beer: but howsoever it be used, with moderation, it is of prime force to long life. 52

As *Opium* holds the preheminance in condensing the *Spirits*, by putting them to *Flight*; and hath wichal his *Subordinates*, lesse potent, but more safe, which may be taken both in greater quantity, and in more frequent use; of which we have formerly spoken: So also *Nitre* which condenses the *Spirits* by cold, and by a kinde of *Frescour*, (as we now-a-days speak) hath also his *Subordinates*. 53

Subordinates to *Nitre* are, All those things which yeeld an Odour, some-what Earthy; like the smell of Earth, pure and good, newly digged or turned up: Of this sort the chief are, *Borage*, *Buglosse*, *Langue de Boeuf*, *Burnet*, *Straw-berry-leaves*, and *Straw-beries*, *Frambois*, or *Raspas*, *Raw Cucumbers*, *Raw Pearmains*, *Vine-leaves*, and *Buds*; also *Violets*. 54

The next in order, are those which have a certain freshnesse of smell, but some-what more inclined to Heat; yet not altogether void of that vertue of Refreshing, by coolnesse: such as are, *Balme*, *Green Citrons*, *Green Oranges*, *Rose-water distilled*, *Roasted Wardens*; also the *Damask*, *Red*, and *Musk Roses*. 55

This is to be noted, That *Subordinates* to *Nitre*, do commonly conferre more to this *Intention*, *Raw*, than having passed the Fire; because that *Spirit* of Cooling is dissipated by the Fire: Therefore they are best taken, either infused in some liquor, or *Raw*. 56

As the condensation of the *Spirits* by *subordinates* to *Opium*, is, in some sort, performed by *Odours*: So also that, which is by *subordinates* to *Nitre*: Therefore the smell of new and pure *Earth*, taken either by following the Plough, or by digging, or by weeding, excellently refresheth the *Spirits*. Also the leaves of Trees in Woods, or Hedges, falling towards the middle of Autumn, yeeld a good refreshing to the *Spirits*; but none so good as *Straw-berry-leaves* dying. Likewise the smell of *Kiolets*, or *Wall-flowers*, or *Bean-flowers*, or *Sweet-briar*, or *Hony-suckles*, taken, as they grow, in passing by them onely, is of the same nature. 57

Nay, and we know a certain great Lord, who lived long, that had every morning immediately after sleep, a *Clod* of fresh *Earth*, laid in a faire Napkin, under his Nose, that he might take the smell thereof. 58

There is no doubt, but the cooling and tempering of the blood by cool things, such as are, *Endive*, *Suocoury*, *Liver-wort*, *Puislain*, and the like, do also by consequent, cool the *Spirits*: But this is about; whereas vapours cool immediately. 59

And as touching the condensing of the *Spirits* by *Cold*, thus much: The third way of condensing the *Spirits*, we said to be, by that which we call *stroaking* the *Spirits*: The fourth, by *quieting* the *Alacrity* and *Unrulinesse* of them. 60

Such things *stroake* the *Spirits*, as are, pleasing and friendly to them, yet they allure them not to goe abroad; but rather prevail, that the *Spirits* contented, as it were, 61

in their own society, do enjoy themselves; and betake themselves into their proper Center.

- 61 For these, if you re-collect those things which were formerly set down, as *Subordinates* to *Opium* and *Nitre*, there will need no other *Inquisition*.
- 62 As for the quieting of the *unrulinesse* of the *Spirits*, we shall presently speak of that, when we enquire touching their *Motion*. Now then, seeing we have spoken of that *condensation* of the *Spirits*, which pertaineth to their substance, we will come to the *Temper* of *Heat* in them.
- 63 The *Heat* of the *Spirits*, as we said, ought to be of that kinde, that it may be *robust*, not *eager*; and may delight rather to master the tough and obstinate, than to carry away the thin and light *Humours*.
- 64 We must beware of *Spices*, *Wine*, and strong *Drinks*; that our use of them be very temperate, and sometimes discontinued; Also of *Savory*, *Wild-marjoram*, *Peny-royal*, and all such as bite and heat the tongue. For they yeeld unto the *Spirits* an *Heat*, not *Operative*, but *Predatory*.
- 65 These yeeld a *Robust* heat, especially *Elecampane*, *Garlick*, *Carduus Benedictus*, *Water-cresses*, while they are young, *Germander*, *Angelica*, *Zedoary*, *Vervin*, *Valerian*, *Myrrhe*, *Pepper-wort*, *Elder-Flowers*, *Carden-Chervile*; The use of these things, with choyle, and judgement, sometimes in *Sallets*, sometimes in *Medicines*, will satisfie this *Operation*.
- 66 It falls out well, that the *Grand Opiates* will also serve excellently for this *Operation*, in respect that they yeeld such an *Heat* by composition, which is wished, but not to be found in *Simples*. For the mixing of those excessive hot things, (such as are *Euphorbium*, *Pellitory* of *Spain*, *Stavis-acre*, *Dragon-wort*, *Anacordi*, *Castoreum*, *Arsipolochium*, *Opoponax*, *Ammoniacum*, *Galbanum*, and the like; which of themselves cannot be taken inwardly,) To qualifie and abate the *Stupefactive* vertue of the *Opium*; They do make such a constitution of a *Medicament*, as we now require, which is excellently seen in this; That *Treacle*, and *Mithridate*, and the rest, are not sharp, nor bite the tongue, but are onely some-what bitter, and of strong scent; and at last manifest their heat, when they come into the *stomack*, and in their subsequent operations.
- 67 There conduce also, to the *Robust Heat* of the *Spirits*, *Venus* often excited, rarely performed: And, no lesse, some of the *affectiōns*, of which shall be spoken hereafter. So touching the heat of the *Spirits*, Analogical to the prolongation of *Life*, thus much.
- 68 Touching the *Quantity* of the *Spirits*, that they be not *exuberant*, and *boiling*; but rather *sparing*, and within a mean, (seeing a small flame doth not devour so much, as a great flame,) the *Inquisition* will be short.
- 69 It seems to be approved by experience; That a *spare Diet*, and almost a *Pythagorical*; such as is either prescribed by the strict Rulers of a *Monasticall life*, or practiced by *Hermitas*, which have *Necessity* and *Poverty* for their *Rule*; rendreth a man long liv'd.
- 70 Hitherto appertain, *Drinking of water*, *A hard Bed*, *Abstinence from Fire*, *A slender Diet*; (as namely, of *Herbs*, *Fruits*, *Flesh*, and *Fish*, rather powdered, and salted, than *fresh*, and *hot*; *An hair-shirt*, *frequent Fastings*, *frequent watchings*, *few sensual pleasures*, and such like: For all these diminish the *Spirits*, and reduce them to such a *quantity*, as may be sufficient onely for the *Functions* of *Life*; whereby the *Depredation* is the lesse.
- 71 But if the *Diet* shall not be altogether so *Rigorous*, and *Mortifying*; yet notwithstanding shall be always *equal* and *constant* to it selfe, it worketh the same effect. We see it in *Flames*, that a *Flame* some-what bigger, (so it be always alike, and quiet) consumeth lesse of the *Fuel*, than a lesser *Flame* blown with *Bellows*; and by *Gusts* stronger, or weaker: That which the *Regiment* and *Diet* of *Cornarus* the *Venetian* shewed plainly; who did eat and drinke so many yeares together, by a just weight, whereby he exceeded an hundred yeares of *Age*, strong in *Limbes*, and entie in his senses.
- 72 Care also must be taken, that a body plentifully nourished, and not emaciated by any of these aforesaid *Diets*, omitte not a reasonable use of *Venus*; lest the *Spirits* increase too fast, and soften, and destroy the body. So then touching a moderate *quantity* of *Spirits*, and (as we may say) *Frugal*, thus much.
- 73 The *Inquisition*, touching *Bridling* the *Motions* of the *Spirits*, followeth next.

Motion, doth manifestly Attenuate, and In flame them. This Buidling is done by three means : by *Sleep*, by avoiding of *vehement Labours*, *Immoderate Exercise*, and, in a word, all *Lassitude*, and by restraining *Irkesome Affections*. And first, touching *Sleep*.

The Fable tells us, that *Epimenides* slept many years together, in a Cave; and all that time needed no Meat; because the *Spirit* waste not much in *sleep*. 74

Experience teacheth us, that certain Creatures, as *Dormice*, and *Bats*, *sleep*, in some close places, an whole winter together; Such is the force of *Sleep*, to restrain all vital Consumption. That which *Bees*, and *Drones*, are also thought to do; though sometimes destitute of Honey; and likewise *Butter-flies*, and other *Flies*. 75

Sleep after *Dinner* (the stomach sending up no unpleasing Vapours to the Head, as being the first Dewes of our Meat,) is good for the *Spirits*, but derogatory and hurtful, to all other points of Health. Notwithstanding in extream Old age, there is the same Reason, of Meat, and *Sleep*; For both, our Meals, and our *Sleeps* should be then frequent, but short, and little: Nay, and towards the last Period of old age, a meer *Rest*, and, as it were, a perpetual *Reposing* doth best; Especially in winter time. 76

But as Moderate *Sleep*, conferreth to long life; so much more, if it be *Quiet*, and not Disturbed. 77

These procure *Quiet Sleep*, *Violets*, *Lettuce*, especially boiled; *Syrup* of dried *Roses*, *Saffron*, *Balm*, *Apples*, at our going to bed; A *Sop* of Bread in *Malmsey*, especially where *Musk*, *Roses* have been first *infused*; therefore, it would not be amisse, to make some *Pill*, or a small Draught of these things, and to use it familiarly. Also those Things, which shut the Mouth of the Stomack close; As *Coriander-seed* prepared; *Quinces*, and *Wardens*, roasted, do induce sound sleep: but above all things, in youth, and for those that have sufficient strong Stomacks, it will be best, to take a good Draught of *Clear*, *Cold Water*, when they go to bed. 78

Touching voluntary and procured Traunces; As also Fixed, and Profound thoughts, so as they be without Irkesomnesse; I have nothing certain: No doubt, they make to this Intention; And condense the Spirits, and that more potently, than Sleep; Seeing, they lay asleep, and suspend the senses, as much, or more. Touching them, let further Inquiry be made. So far touching Sleep.

As for *Motion*, and *Exercise*; *Lassitude* hurteth; And so doth all *Motion*, and *Exercise*, which is too Nimble, and Swift; as *Running*, *Tennis*, *Fencing*, and the like. And again, when our strength is extended, and strained, to the uttermost; as *Dancing*, *Wrestling*, and such like: For it is certain, that the *Spirits*, being driven into streights, either by the swiftnesse of the *Motion*, or by the streining of the forces, do afterward become more Eager, and Predatory. On the other side, *Exercises*, which stir up a good strong *Motion*; but not over-swift, or to our utmost strength, (such as a.e. *Leaping*, *Shooting*, *Riding*, *Bowling*, and the like) do not hurt, but rather benefit. 79

We must come now to the *Affections*, and *Passions* of the *Minde*, and see, which of them are hurtful to long life, which profitable.

Great joyes attenuate and diffuse the *Spirits*, and shorten life: *Familiar Cheerfulness* strengthens the *Spirits*, by calling them forth, and yet not resolving them. 80

Impressions of joy in the sense, are naught; ruminations of *Joy* in the *Memory*; Or *Apprehensions* of them, in *Hope*, or *Fancie*, are good. 81

Joy suppressed, or communicated sparingly, doth more comfort the *Spirits* than *joy* poured forth and published. 82

Grief and *sadness*, if it be void of *Fear*, and afflict not too much, doth rather prolong life; For it contracteth the *Spirits*, and is a kind of *Condensation*. 83

Great Fears shorten the Life; For though *Grief* and *Fear* do both streighten the *Spirit*, yet in *Grief* there is a simple *Contraction*; but in *Feare*, by Reason of the *Cares* taken for the *Remedy*, and *Hopes* intermixed, there is a *turmoil* and *Vexing* of the *Spirits*. 84

Anger suppressed, is also a kinde of *Vexation*, and causeth the *Spirit* to feed upon the *Juices* of the body: But let loose, and breaking forth, it helpeth; As those *Medicines* do, which induce a *Robust Heart*. 85

Envy is the worst of all *Passions*, and feedeth upon the *Spirits*; and they again upon the *Body*, and so much the more, because it is perpetual, and it is said, *Keepeth no Holy-days*. 86

Pity of another Mans *Misfortune*, which is not likely to befall our selves, is good: 87

But *Pity*, which may reflect, with some similitude, upon the party pitying, is naught because it exciteeth *Fear*.

88 *Light Shame* hurteth not, seeing it contracteth the *Spirits* a little, and then straight diffuseth them; In-somuch that *Shame-fast* Persons commonly, live long: But *Shame*, for some great Ignominie, and which afflicteth the *Minde* long, contracteth the *Spirits* even to suffocation, and is pernicious.

89 *Love*, if it be not unfortunate, and too deeply wounding, is a kinde of *Joy*; And is subject to the same Lawes, which we have set down touching *Joy*.

90 *Hope* is the most Beneficial of all the *Affections*; And doth much to the Prolongation of *Life*, if it be not too often Frustrated; but entertaineth the *Fancie*, with an Expectation of good: Therefore they which fix, and propound to themselves, some End, as the Marke and Scope of their *Life*; And continually, and by Degrees, goe forward in the same; Are, for the most part long-Liv'd: In-somuch, that when they are come to the top of their hope; And can go no higher therein; They commonly droop, and Live not long after: So that hope is a *Leaf-Ioy*; Which may be beaten out, to a great Extension, like *Gold*.

91 *Admiration*, and *Light contemplation*, are very powerful, to the prolonging of *Life*; For they hold the *Spirits*, in such things as Delight them; and suffer them not to tumultuate, or to carry themselves unquietly, and way-wardly. And therefore, all the *Contemplators* of *Natural Things*, which had so many, and so eminent Objects to admire; (as *Democritus*, *Plato*, *Parmenides*, *Apollonius*,) were long-liv'd: Also *Rhetoricians*, which tasted but lightly of things, and studied rather Exornation of speech, then profundity of Matters, were also long liv'd; As *Gorgias*, *Protagoras*, *Isocrates*, *Seneca*: And certainly, as old Men are, for the most part, Talkative: So Talkative Men, do often grow very old: For it shews a *Light Contemplation*; And such as doth not much strain the *Spirits*, or vex them: But Subtil, and Acute, and Eager Inquisition, shortens life; for it tareth the *Spirit*; and wasteth it.

And as touching the *Motion* of the *Spirits*, by the *Affections* of the *Minde*, thus much. Now we will add certain other General *Observations*, touching the *Spirits*, beside the former; which fall not into the Precedent Distribution.

92 Especial Care must be taken, that the *Spirits* be not too often *Resolved*; For attenuation goeth before *Resolution*: And the *Spirit* once attenuated, doth not very easily retire, or is *Condensed*: Now *Resolution* is caused, by Over-great Labours; Over-vehement affections of the *Mind*; Over-great Sweats; Over-great Evacuations; Hot-baths, and an untemperate, and unseasonable use of *Venus*: Also by Over-great Cares, and Carplings, and Anxious Expectations: Lastly, by Malignant Diseases, and Intolerable Pains and Torments of the *Body*; All which, as much as may be, (which our *Vulgar Physicians* also advise,) must be avoided.

93 The *Spirits* are delighted, both with *Wanted Things*, and with *New*: Now it maketh wonderfully to the conservation of the *Spirits*, in *Vigour*; That we neither use *Wanted Things*, to a Satiety, and Glutting; Nor *New Things*, before a quick, and strong Appetite. And therefore, both *Customes* are to be broken off, with Judgement, and Care, before they breed a fulness; And the *Appetite*, after new Things to be restrained for a time, untill it grow more sharp and-jocund: And moreover, the *Life*, as much as may be, so to be ordered; That it may have many *Renovations*, and the *Spirits* by perpetual *Conversing* in the same Actions, may not wax Dull, for though it were no ill saying of *Seneca's*; *The fool doth ever begin to live*; Yet this Folly, and many more such, are good for long *Life*.

94 It is to be observed, touching the *Spirits*, (though the *Contrary* useth to be done;) That when Men perceive their *Spirits* to be in good, placide, and Healthful state; (That which will be seen, by the *Tranquility* of their *Minde*, and cheerful disposition;) That they cherish them, and not change them: But when, in a Turbulent, and un-toward State; (which will also appear by their Sadnesse, Lumpishnesse, and other In-disposition of their *Minde*;) that when they straight over-whelm them, and alter them. Now the *Spirits* are contained in the same state, by a *Restraining* of the *Affections*; temperateness of *Diet*; *Abstinence* from *Venus*, *Moderation* in *Labour*; *Indifferent Rest* and *Repose*: And the *Contrary* to these, do alter and over-whelm the *Spirits*; As namely, *Vehement Affections*; *Profuse Feastings*; *Immoderate Venus*; *Difficult labours*; *Earnest studies*, and prosecution of business. Yet Men are wont, when they are merriest, and best disposed, then to apply themselves to *Feastings*,

Vices, Labours, Endeavours, Business; whereas, if they have a regard to long Life, (which may seem strange,) they should rather Practise the Contrary. For we ought to cherish and preserve good Spirits; And for the evil disposed Spirits, to discharge and alter them,

Ficinus saith not unwisely; That Old Men, for the comforting of their Spirits, ought often to remember, and ruminate upon the Acts of their Child-hood and Youth. Certainly, such a Remembrance, is a kind of Peculiar Recreation, to every Old Man: And therefore it is a Delight to Men, to enjoy the Society of them, which have been brought up together with them; And to visit the Places of their Education. Vespasian did attribute so much to this Matter; That when he was Emperour, he would, by no means, be perswaded to leave his Fathers house, though but mean; Lest he should lose the wonted Object of his Eyes, and the Memory of his child-hood; And besides, he would drink, in a Wooden Cup, tipped with silver, which was his Grand-mothers, upon Festival Days.

95

One Thing, above all, is gratefull to the Spirits; that there be a Continual Progresse, to the more Benigne. Therefore, we should lead, such a Youth, and Man-hood, that our Old Age should find new Solaccs; Whereof the chiefe is Moderate Ease. And therefore, Old men, in Honourable Places, lay violent hands upon themselves, who reire not to their Ease: whereof may be found an Eminent Example in Cassiodorus; who was of that Reputation amongst the Gothish Kings of Italy, that he was as the Soul of their affairs: Afterwards, being near Eighty yeares of age, he betook himselfe to a Monastery; Where he ended not his Dayes, before he was an Hundred yeares old. But this thing doth require two Cautions; One, that they drive not off, till their Bodies be utterly worne out, and Diseased; For in such Bodies, all Mutation, though to the more Benigne, hasteneth Death: The other, that they surrender not themselves to a Slothfull Ease; But that they Embrace something, which may entertain their thoughts, and Minde, with Contentation: In which kind, the chiefe Delights, are Reading and Contemplation; And then, the Desires of Building, and Planting.

96

Lastly, the same Action, Endeavour, and Labour undertaken cheerfully, and with a good will, doth refresh the Spirits, but with an Aversation, and Unwillingnesse, doth fret and Deject them. And therefore, it conferreth to long life; Either that a Man hath the Art, to institute his life so, as it may be Free, and Sutable to his own Humour; Or else to lay such a Command upon his minde, that whatsoever is imposed by Fortune, it may rather lead him, than drag him.

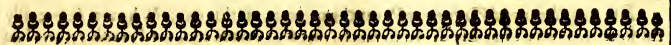
97

Neither is that to be omitted, towards the Government of the Affections, That especial care be taken, of the Mouth of the Stomach; Especially, that it be not too much relaxed; For that part hath a greater Dominion over the Affections; Especially the Daily Affections; Than either the Heart, or Braine, Onely those things excepted, which are wrought by potent Vapours; as in Drunkennesse, and Melancholy.

98

Touching the Operation upon the Spirits, that they may remaine Youthful, and Renew their Vigour, thus much; Which we have done the more accurately, for that there is, for the most part, amongst Physicians, and other Authors, touching these Operations, a deep silence; but especially, because the Operation upon the Spirits, and their Waxing green again, is the most Ready, and Compendious way; to long life: And that, for a two-fold Compendiousnesse; one, because the Spirits work compendiously, upon the body; the other, because Vapours, and the Affections, work compendiously upon the Spirit: So as these attaine the end, as it were, in a right line; Other Things, rather in lines Circular.

99



101

The Operation upon the Exclusion of the Aire 2.

The History.

The Exclusion of the Aire, Ambient, tendeth to Length of Life, two wayes; First, for that the External Aire, next unto the Native Spirits, (howsoever the Aire may be said to animate the Spirit of Man; and conferreth not a little to health;) doth most of all prey upon the Juices of the body;

102

And hasten the Desiccation thereof; And therefore, the *Exclusion* of it, is effectual to Length of Life.

Another effect, which followeth the *Exclusion* of *Aire*, is much more subtil and profound. Namely, that the Body closed up, and not perspiring by the Pores, detaining the *Spirits* within, and turneth it upon the Harder parts of the Body; Whereby the *Spirit* Mollifies, and Intenerates them.

Of this Thing, the Reason is explained in the *Desiccation* of *In-animate Bodies*; And it is an Axiome almost infallible; That the *Spirit* Discharged, and Issuing forth, drieth Bodies, Detained, melteth, and intenerateth them: And it is further to be assumed; That all Heat doth properly Attenuate and moisten; And Contracteth, and Drieth only by Accident.

Leading the Life in *Dens* and *Caves*, where the *Aire* receives not the Sun-beams, may be effectual to Long Life. For the *Aire*, of it selfe, doth not much towards the Depredation of the Body, unlesse it be stirred up by Heat. Certainly, if a Man shall recall Things past to his Memory, it will appear, that the Statures of Men, have been anciently much greater, than those that succeeded; As in *Sicily*, and some other Places. But this kind of Men led their Lives, for the most part, in *Caves*. Now Length of Life, and largeness of Limbs, have some Affinity. The *Cave* also of *Epimenides*, walkes amongst the Fables. I suppose likewise, that the Life of *Columnar Anchorites*, was a thing Resembling the Life in *Caves*; in respect, the Sun-beams could not much pierce thither; Nor the *Aire* receive any great changes, or In-equalities. This is certain; both the *Simoon*, *Stylita's* as well *Daniel*, as *Saba*; And other *Columnar Anchorites*, have been exceeding long-liv'd. Likewise, the *Anchorites* in our dayes, closed up and immured, either within Walls, or Pillars, are often found to be long-liv'd.

Next unto the life in *Caves*, is the life on *Mountaines*: For as the Beames of the Sun, doe not penetrate into *Caves*; so on the Tops of Mountaines, being destitute of Reflexion, they are of small force. But this is to be understood of Mountaines, where the *Aire* is cleer, and pure; Namely, whether, by reason of the Drienesse of the Valleys, Clouds, and Vapours, do not ascend: As it is in the Mountaines, which encompass *Barbary*; Where, even at this day, they live many times, to an Hundred and fifty yeares; As hath been noted before.

And this kind of *Aire*; of *Caves*, and *Mountaines*, of his owne proper Nature, is little or nothing Predatory: But *Aire*, such as ours is, which is Predatory through the heat of the Sunne, ought, as much as is possible, to be excluded from the Body.

But the *Aire*, is prohibited, and excluded two wayes; first, by *Closing* the Pores; secondly, by *Filling* them up.

To the *Closing* of the Pores, Help; Coldnesse of the *Aire*; Going naked, whereby the Skin is made Hard; Washing in Cold Water; Astringents applyed to the skin; Such as are *Mastick*, *Myrrhe*, *Myrtle*.

But much more may we satisfie this Operation, by *Baths*; yet those rarely used; (especially in Summer;) which are made of *Astringent Mineral waters*, such as may safely be used; As Waters participating of Steel and Copperas; For these do potently contract the Skin.

As for *Filling* up the Pores, *Faintings*, and such like *Unctuous Dawbings*; And, (which may most commodiously be used) *Oile*, and *Fat Things*; Do no lesse conserve the substance of the body, than *Oile* colours and Varnish doe preserve Wood.

The Ancient *Brittains* painted their Bodies with *Woad*, and were exceeding long Liv'd: the *Picts* also used Paintings; And are thought, by some to have derived their Name from thence.

The *Brazilians* and *Virginians* Paint themselves, at this day; Who are, (especially the former,) very long Liv'd. In so much, that five yeares ago, the *French Jesuits* had speech with some, who remembred the Building of *Fernamburgh*; which was done an hundred and twenty yeares since. And they were then at *Mar's estate*.

Joannes de temporibus, who is reported to have extended his life to three hundred yeares; being asked, How he preserved himselfe so long; Is said to have answered by *Oile without*, and by *Honey within*.

The *Irish*, especially the *Wild-Irish*, even at this day, live very long. Certainly, they report, that within these few yeares, the *Countesse of Desmond* lived to an hundred and forty yeares of Age, and bred teeth three times. Now the *Irish* have a fashion, to chafe, and, as it were, to baste themselves with old Salt-butter, against the Fire.

The same *Irish* use to wear *Saffroned Linnen*, and Shirts, which though it were at first devised to prevent vermine, yet howsoever, Itake it, to be very usefull for lengthning of life: For *Saffron* of all things that I know, is the best thing for the skin, and the comforting of the flesh; seeing it is both notably Astringent; and hath besides, an Oleosity, and subtil heat, without any Acrimony. I remember a certaine *Englishman*, who when he went to Sea, carried a bagge of *Saffron* next his Stomach, that he might conceal it, and so escape Custome: And whereas he was wont to be alwayes exceeding Sea-sick; at that that time he continued very well, and felt no provocation to vomit.

15

Hippocrates adviseth, in Winter to weare clean Linnen; and in Summer, foule Linnen, and besmeared with Oile; The Reason may seem to be, because in Summer the *Spirits* exhale molt; Therefore the pores of the skin would be filled up.

16

Hereupon we are of opinion, that the use of *Oile*, either of *Olives*, or sweet *Almonds*, to anoint the skin therewith, would principally conduce to long life: The *anointing* would be done every morning, when we rise out of Bed, with Oile, in which a little *Bay-salt* and *Saffron* is mixed. But this *Anointing* must be lightly done, with Wooll, or some soft sponge; not laying it on thick, but gently touching, and wetting the skin.

17

It is certain, that *Liquours*, even the Oily themselves, in great quantities draw somewhat from the body; but contrarily, in small quantities, are drunk in by the body; Therefore the anointing would be but light, as we said; or rather the shirt it selfe, would be besmeared with oile.

18

It may haply be objected, that this anointing with oile, which we commend, (Though it were never in use with us; and amongst the *Italians* is cast off againe) was anciently very familiar amongst the *Grecians* and *Romans*, and a part of their Diet; and yet men were not longer liv'd in those dayes than now. But it may rightly be answered, Oile was in use onely after Bathes, unlesse it were, perhaps amongst *Champions*; Now hot Bathes, are as much contrary to our operation, as *Anointings* are congruous; seeing the one opens the passages, the other stops them up. Therefore the Bath, without the anointing following, is utterly bad; the anointing without the Bath, is best of all. Besides, the anointing amongst them, was used, onely for *Delicacy*: Or, (if you take it at the best) for *Health*; But by no means in order to long life: and therefore they used them with all precious ointments, which were good for delicioufnesse, but hurtfull to our Intention, in regard of their heat; so that *Virgil* seemeth not to have said amisse;

19

Nec Casta liquidi corrumpitur usus Olivi.

That odoriferous Castia hath not supplanted the use of neat Oile-Olive.

Anointing with *Oile*, conduceth to health, both in Winter, by the exclusion of the cold *Aire*; and in Summer, by detaining the *Spirits* within, and prohibiting the Resolution of them; And keeping off the force of the *Aire*, which is then most predatory.

20

Seeing the anointing with *Oile*, is one of the most potent operations to long life; we have thought good to add some Cautions, lest the health should be endangered. They are four, according to the four *Inconveniences* which may follow thereupon.

21

The first *Inconvenience* is; that by *repressing sweats*, it may engender Diseases from those excrementitious Humours. To this a remedy must be given by *Purges* and *Clysters*; that evacuation may be duly performed. This is certain, that evacuation by sweats, commonly advanceth health, and derogateth from long life: But gentle *Purges* work upon the Humours, not upon the *Spirits*, as Sweat doth.

22

The second *Inconvenience* is; that it may *heat* the body, and in time inflame it: For the *Spirits* shut in, and not breathing forth, acquire heat. This inconvenience may be prevented, if the *Diet* most usually incline to the colder part; and that at times, some proper cooling Medicines be taken, of which we shall straight speak, in the operation upon the blood.

23

The third is, that it may *annoy the head*: For all *Oppletion* from without, strikes back the vapours, and sends them up unto the head. This inconvenience is remedied by *Purgers*, especially, *Clysters*; and by shutting the mouth of the Stomach strongly, with *Stipticks*; and by combing and rubbing the head, and by washing it with convenient *Lies*, that something may exhale; and by not omitting competent and good exercises, that something also may perspire by the skin.

24

25

The fourth *Inconvenience*, is a more subtle Evil; namely, that the Spirit, being detained by the closing up of the *Pores*, is likely to multiply it self too much: For when little issueth forth, and new Spirit is continually ingendred, the Spirit increaseth too fast, and so preyeth upon the body more plentifully. But this is not altogether so; for all Spirit closed up, is dull: (For it is blown and excited with motion, as Flame is,) and therefore it is lesse active, and lesse generative of it selfe: Indeed it is thereby increased in Heat, (as Flame is) but slow in Motion: and therefore the remedy to this Inconvenience, must be by cold things; being sometimes mixed with *Oile*; such as are *Roses* and *Mirtles*; For we must altogether disclaim hot things, as we said of *Cassa*.

26

Neither will it be unprofitable, to wear next the Body, Garments that have in them, some *Unctosity*, or *Oleosity*, not *Aquosity*; for they will exhaust the Body lesse: Such as are those of Woollen; rather than those of Linnen. Certainly, it is manifest in the Spirits of Odours, That if you lay sweet powderis amongst Linnen, they will much sooner lose their smell, than amongst Woollen. And therefore Linnen is to be preferred for delicacy and neatnesse, but to be suspected for our *Operation*.

27

The *Wild Irish*, as soon as they fall sick, the first thing they doe, is to take the sheets off their beds, and to wrap themselves in the woollen cloathes.

28

Some report, that they have found great benefit in the conservation of their health, by wearing *Scarlet Wascos* next their skin, and under their shirts, as well down to the nether parts, as on the upper.

29

It is also to be observed, that *Aire*, accustomed to the Body, doth lesse prey upon it, than new Aire, and often changed. And therefore poor people, in small Cottages, who live alwayes within the smell of the same chimney, and change not their seats, are commonly longest liv'd: notwithstanding, to other Operations, (especially for them whose Spirits are not altogether dull) we judge change of aire to be very profitable, But a mean must be used, which may satisfie on both sides; This may be done by removing our habitation four times a year, at constant and set times, unto convenient seats; that so the body may neither be in too much peregrination, nor in too much station. And touching the *Operation*, upon the *Exclusion* of *Aire*, and avoiding the predatory force thereof, thus much.



The Operation upon the Blood, and the Sanguifying Heat. 3.

The History.



The following *Operations*, answer to the two precedent; and are in the Relation of *Passives*, to *Actives*: For the two precedent intend this, That the *Spirits* and *Aire* in their actions may be the lesse depredatory; and the two latter, that the *Blood* and *Juice* of the Body may be the lesse depredable. But because the blood is an irrigation, or watering of the Juices, and Members; and a preparation to them: therefore we will put the operation upon the *Blood* in the first place.

Concerning this *Operation*, we will propound certain Counsels, few in number; but very powerfull in vertue. They are three.

2

First, there is no doubt, but that if the blood be brought to a cold temper, it will be so much the lesse dissipable. But because the cold things, which are taken by the mouth, agree but ill with many other Intentions; therefore it will be best to finde out some such things, as may be free from these Inconveniencies. They are two.

3

The first is this: Let there be brought into use, especially in youth, *Clysters*, not *Purgings* at all, or *Absterging*, but onely cooling, and somewhat opening: Those are approved, which are made of the Juices of *Lettuce*, *Purslane*, *Liver-wort*, *Honsteeke*, and the *Mucilage* of the seed of *Flew-wort*, with some temperate opening decoction; And a little

little *Camphire*: but in the declining Age, let the *Housleek*, and *Purslain* be left out: And the Juices of *Borage* and *Endive*, and the like, be put in their rooms: And let these *Clysters* be retained, if it may be, for an hour, or more.

The other is this, Let there be in use, especially in Summer, *Babes* of fresh water, and but luke-warm, altogether without *Emollients*, as *Mallows*, *Mercury*, *Milke*, and the like; rather take new *whcy* in some good quantity, and *Roses*.

But, (that which is the principal in this Intention, & New) we advise, that before the bathing, the body be anointed with *Oile*, with some *Thicknesse*; whereby the quality of the cooling may be received, and the water excluded: yet let not the pores of the body be shut too close: For when the outward cold closeth up the body too strongly, it is lo far from furthering coolnesse, that it rather forbids it, and stirs up Heat.

Like unto this, is the use of *Bladders* with some decoctions and cooling Juices, applied to the inferiour Region of the body; namely, from the ribs to the privy parts: for this also is a kinde of *bathing*, where the body of the liquor is for the most part excluded, and the cooling quality admitted.

The third Counsel remaineth, which belongeth not to the quality of the *blood*, but to the substance thereof, that it may be made more firme and lesse dissipable; and such, as the heat of the Spirit may have the lesse power over it.

And as for the use of *Filings of gold*, *Leaf-gold*, *powder of Pearl*, *Precious stones*, *Corall*, and the like, we have no opinion of them at this day, unless it be onely as they may satisfie this present *Operation*. Certainly, seeing the *Arabians*, *Grecians*, and *Modern Physicians*, have attributed such vertues to these things; It cannot be altogether Nothing, which so great Men have observed of them. And therefore omitting all fantastical Opinions about them, we do verily believe; That if there could be some such thing conveyed into the whole Masse of the blood, in Minute and fine Portions; Over which the Spirits, and heat should have little, or no power; Absolutely, it would not onely resist *Purresfaction*, but *Arefaction* also, and be a most effectual Means, to the prolongation of life. Nevertheless, in this thing, several Cautions are to be given. First, that there be a most exact Communion. Secondly, that such hard and solid Things, be void of all Malignant Qualities; Left while they be disperfed, and lurk in the veines, they breed some ill convenience: Thirdly, that they be never taken together with Meats, nor in any such manner, as they may stick long; Left they beget dangerous obstructions, about the Mesentery: Lastly, that they be taken very rarely, that they may not congregate, and knot together, in the veins.

Therefore let the manner of taking them be *Fasting* in *White wine*; A little *Oile* of *Almonds* mingled therewith; *Exercise* used immediately upon the taking of them.

The *Simples*, which may satisfie this *Operation*, are; In stead of all, *Gold*, *Pearls*, and *Corall*: For all *Mettals*, except *Gold*, are not without some Malignant Quality, in the Dissolutions of them; Neither will they be beaten, to that exquisite Finenesse, that *Leaf-Gold* hath: As for all *Glassie*, and *Transparent Jewels*, we like them not, (as we said before,) for feare of Corrosion.

But in our judgement, the safer, and more effectual way, would be, by the use of *Woods*, in Infusions, and Decoctions; For there is in them sufficient, to cause *Firminesse* of *Blood*; And not the like danger, for breeding Obstructions: But especially, because they may be taken in Meat, and Drink; whereby they will finde the more easie Entrance into the veins; And not be voided in Excrements.

The *woods*, fit for this purpose, are, *Sanders*, the *Oake*, and *Vine*: As for all *Hot woods*, or something *Rosennie*, we reject them: Notwithstanding you may add the *woody Stalks* of *Rose-mary* dried: For *Rose-marie* is a Shrub, and exceedeth in Age, many trees; Also, the *woody Stalks* of *Ivye*, but in such quantity, as they may not yeeld an unpleasing taste.

Let the *woods* be taken, either boiled in broaths; Or infused in *Must*, or *Ale*, before they leave working, but in broaths, (as the custome is, for *Gnaiacum*, and the like,) they would be infused a good while, before the boiling; That the firmer part of the *wood*, and not that onely which lieth loosely, may be drawn forth. As for *Ash*, though it be used for *Cups*; yet we like it not. And touching the *Operation* upon the *Blood*, thus much,

The Operation upon the Juices of the body. 4.

The History.



Here are two kinds of *Bodies*, (as was said before in the *Inquisition* touching *In-animates*) which are hardly consumed; *Hard* things, and *Fat* things, as is seen in *Metals*, and *Stones*, and in *Oile* and *Wax*.

It must be ordered therefore, that the *Juice* of the *Body* be some-what *hard* and that it be *fatty*, or *subrosicide*.

As for *hardnesse*, it is caused three ways; by *Aliment* of a *firm Nature*, by *Cold* condensing the skin and flesh; and by *Exercise*, binding and compacting the Juices of the body, that they be not soft and frothy.

As for the *Nature* of the *Aliment*, it ought to be such as is not easily *Disippable*: Such as are *Beefe*, *Swines-flesh*, *Deer*, *Goat*, *Kid*, *Swan*, *Goose*, *Ring-Dove*; Especially if they be a little powdered; *Fish* likewise salted and dried: *Old Cheese*, and the like.

As for the *Bread*; *Oaten bread*, or *bread* with some mixture of *Pease* in it; Or *Rye bread*, or *Barly bread*, are more solid than *Wheat bread*: and in *Wheat bread* the course *Cheat Bread* is more solid than the pure *Manchet*.

The inhabitants of the *Orcades*, which live upon *salted fish*; and generally all *Fish-eaters* are long-liv'd.

The *Monks* and *Hermits*, which fed sparingly, and upon dry *Aliment*, attained commonly to a great Age.

Also *Pure water*, usually drunk, makes the Juices of the body lesse frothy; unto which, if for the dulnesse of the spirits, (which, no doubt, in *water* is but a little penetrative;) you shall add a little *Nitre*, we conceive it would be very good. And touching the *Firmnesse* of the *Aliment*, thus much.

As for the *Condensation* of the *skin*, and *Flesh*, by *cold*: They are longer liv'd, for the most part, that live abroad in the *open Aire*, than they that live in *Houses*; and the Inhabitants of the *cold Countries*, than the Inhabitants of the *hot*.

Great store of *cloaths*, either upon the bed, or back, do resolve the body.

Washing the *body* in *cold water*, is good for length of life: Use of *hot Baths* is naught. Touching *Baths* of *Astringent mineral waters*, we have spoken before.

As for *exercise*; an *idle life*, doth manifestly make the flesh soft and disippable: *Robust exercise* (so it be without over-much sweating or wearinesse,) maketh it hard and compact. Also *exercise* within cold water, as *swimming*, is very good: And generally *exercise* abroad is better than that within houses.

Touching *Frications*, (which are a kinde of *exercise*) because they do rather call forth the *Aliment*, than harden the flesh; we will enquire hereafter in the due place.

Having now spoken of *hardning the Juices* of the *body*, we are to come next to the *Oleosity*, or *Fattinesse* of them: which is a more perfect and potent Intention, than *Induration*, because it hath no inconvenience, nor evill annexed: For all those things which pertain to the *hardning of the Juices*, are of that nature, that while they prohibit the absorption of the *Aliment*, they also hinder the operation of the same: Whereby it happens, that the same things are both propitious, and adverse to length of life: But those things which pertain to making the *Juices oily*, and *Roscid*, help on both sides; For they render the *Aliment* both lesse *Disippable*, and more *Reparable*.

But whereas we say, that the *Juice* of the *body* ought to be *Roscid*, and *Fat*, it is to be noted, that we mean it not of a visible *Fat*, but of a *Dewinesse* dispersed, or (if you will call it) *Radicall* in the very substance of the body.

Neither again, let any man think, that *Oil*, or the *Fat* of *Meats*, or *marrow*, do engender the like, and satisfy our Intention: For those things which are once perfect, are not brought back again; but the *Aliments* ought to be such, which after *Digestion*, and *Maturation*, do then in the end, engender *Oleosity* in the *Juices*.

Neither again, let any man think, that *Oile* or *Fat*, by it selfe, and *Simple*, is *Hard* of *Disippation*, but in *Mixture* it doth not retain the same *Nature*: For as *Oile* by it selfe, is much more longer in consuming, than *water*; so in *Paper*, or *Linnen*, it sticketh longer, and is later dried, as we noted before.

To the Irroration of the body, roasted meats, or baked meats, are more effectual than boyled meats: and all preparation of meat with water, is inconvenient: Besides, Oyl is more plentifully extracted out of dry bodies, than out of moist bodies.

18

Generally, to the Irroration of the body, much use of sweet things is profitable. as of Sugar, Honey, sweet Almonds, Pine-apples, Pistaccio's, Dates, Raisons of the Sun, Corans, Figs, and the like. Contrarily all, four and very salt, and very biting things, are opposite to the generation of Rosicida Juyce.

19

Neither would we be thought to favour the *Muriches*, or their diet, though we commend the frequent use of all kinds of seeds, and kernels, and roots; in meats, or sauces; considering all bread (and bread is that which maketh the meat firm) is made eith. of seeds or roots.

20

But there is nothing makes so much to the Irroration of the body, as the quality of the Drink; which is the convoy of the meat: therefore let there be in use such drinks, as without all acrimony or sourness, are not withstanding subtil; such are those wines, which are (as the old woman said in *Plautus*) *vetustate edentula*, toothless with age; and *Ale* of the same kind.

21

Mead (as we suppose) would not be ill, if it were strong and old: But because all Honey hath in it some sharp parts; (as appears by that sharp water which the *Chymists* extract out of it, which will dissolve metals;) It were better to make the same portion of Sugar; not lightly infused in it, but so incorporated, as Honey useth to be in *Mead*; And to keep it to the age of a year, or at least six months, whereby the *VV*ater may lose the crudity, and the Sugar acquire subtilty.

22

Now antient vs in *VV*ine or Beer, hath this in it; That it ingenders subtilty in the Parts of the Liquor, and Acrimony in the Spirits; whereof the first is profitable and the second hurtfull: Now to rectifie this evil commixture, let there be put into the vessell, before the *VV*ine be separated from the Mutt, *Swines flesh*, or *Deers flesh*, well boyled; that the Spirits of the *VV*ine may have whereupon to ruminat and feed; and so lay aside their mordacity.

23

In like manner, if *Ale* should be made, not only with the grains of *VV*heat, Barly Oats, Pease, and the like; but also should admit a part (suppose a third part, to these grains,) of some fat roots; such as are *Potato Roots*, *Pith of Artichoakes*, *Burre-Roots* or some other sweet and esculent Roots,) we suppose it would be a more usefull drink for long life, than *Ale* made of Grains only.

24

Also, such things as have very thin parts, yet notwithstanding are without all Acrimony, or Mordacity, are very good Sallets: which vertue we find to be in some few of the Flowers; namely, Flowers of *Ivy*, which infused in *Vinegar*, are pleasant ever to the taste; *Marygold-leaves*: which are used in broaths; and Flowers of *Ectony*. And touching the operation upon the *Juyces* of the *Body*, thus much.

25



The Operation upon the Bowels for their Extrusion of Aliment. 5:

The History.



What those things are which comfort the *P*incipal Bowels; which are the fountains of Concoctions; Namely, the *Stomach*, *Liver*, *Heart*, and *Brain*; To perform their Functions well; (whereby *Aliment* is distributed into the parts, *Spirits* are dispersed, and the *Reparation* of the whole body is accomplished,) may be derived from *Physicians* and from their *Prescripts* and *Advices*.

1

Touching the *Spleen*, *Gall*, *Kidneys*, *Mesenteries*, *Guts*, and *Lungs*, we speak not; For these are members ministering to the principal: And whereas speech is made touching Health, they require sometime a most especial consideration, because each of these have their diseases, which unless they be cured, will have influence upon the Principal Members: But as touching the prolongation of Life, and Reparation by *Aliments*, and Retardation of the Incoction of Old Age; If the Concoctions, and those

2

those *Principal Bowels* be well disposed: The rest will commonly follow according to ones wish.

3 And as for those things which according to the different state of every mans Body, may be transferred into his Diet, and the Regiment of his Life, he may collect them out of the books of Physicians, which have written of the comforting and preserving the four *Principal members*: For Conservation of health hath commonly need of no more than some short courses of Physick; but length of life cannot be hoped, without an orderly diet, and a constant race of *sovereign medicines*: but we will propound some few, and those the most select and prime directions.

4 The *Stomach*, (which, as they say, is the Master of the House, and whose strength and goodnesse is fundamental to the other concoctions,) ought so to be guarded and confirmed; that it may be without *Intemperateness* Hot; Next *Restricted* or bound, not *Loose*: Furthermore, *Clean*, not surcharged with foul Humours; and yet, (in regard it is nourished from it self, not from the Veins) not altogether *Empty*, or *Hungry*; Lastly, it is to be kept ever in *Appetite*; because *Appetite* sharpens Digestion.

5 I wonder much, how that same *Calidum bibere*, to drink warm drink, (which was in use amongst the Antients) is laid down again. I knew a Physician that was very famous, who in the beginning of dinner and supper, would usually eat a few spoonfulls of very warm *broath*, with much greedinesse: and then would presently wish, that it were out again, saying, *He had no need of the broath, but only of the warmth*.

6 I do verily conceive it good, that the first draught either of *Wine*, or *Ale*, or any other *Drink*, (to which a man is most accustomed) be taken at Supper *warm*.

7 *Wine*, in which *Gold* hath been quenched, I conceive would be very good once in a Meal: Not that I believe the *gold* conferreth any vertue thereunto; but that I know, that the quenching of all Metals in any kind of liquor, doth leave a most potent *Restriction*: Now I chuse *gold*, because besides that *Restriction*, which I desire, it leaveth nothing else behind it, of a metalline impression.

8 I am of opinion, that sops of bread dipped in *Wine*, taken at the midst of the meal, are better than wine it self; especially if there were infused into the wine, in which the sops were dipped, *Rosemary* and *Citron pill*; and that with *Sugar*, that it may not slip too fast.

9 It is certain, that the use of *Quinces* is good to strengthen the Stomach: But we take them to be better, if they be used in that which they call *Quiddeny* of *Quinces*, than in the bodies of the *Quinces* themselves; because they lye heavy in the Stomach. But those *Quiddeny*s are best taken after meals alone; before meals dipped in *Vinegar*.

10 Such things as are good for the Stomach above other Simples, are these, *Rosemary*, *Elecampane*, *Mastick*, *Wormwood*, *Sage*, *Min.*

11 I allow pills of *Aloes*, *Mastick*, and *Saffron*, in Winter time taken before Dinner; but so as the *Aloes* be not only oftentimes washed in *Rosewater*, but also in *Vinegar* in which *Tragacanth* hath been infused; and after that, be macerated for a few hours, in oyle of sweet *Almonds* new drawn, before it be made into pills.

12 *Wine* or *Ale*, wherein *Wormwood* hath been infused, with a little *Elecampane*, and yellow *Sanders* will do well, taken at times, and that especially in Winter.

13 But in Summer a draught of white wine, allayed with *Strawberry-water*; in which Wine, powder of Pearls, and of the shels of *Cry-fishes*, exquisitely beaten; and (which may perhaps seem strange,) a little chalk have been infused, doth excellently refresh and strengthen the Stomach.

14 But generally, all *Draughts* in the morning (which are but too frequently used) of *cooling* things; as of *Juyces*, *Decoctions*, *Whey*, *Barly-waters*, and the like, are to be avoided; and nothing is to be put into the Stomach fasting, which is purely Cold. These things are better given, if need require, either at five in the afternoon, or else an hour after a light breakfast.

15 Often fastings are bad for long life; besides, all thirst is to be avoided; and the Stomach is to be kept clean, but awaies moist.

16 *Oyle* of *Olives* new and good, in which a little *Mithridate* hath been dissolved, appointed upon the back bone, just against the mouth of the Stomach, doth wonderfully comfort the Stomach.

17 A small bagge filled with locks of Scarlet-wool steeped in red Wine; in which
myrtle

Myrtle, and *Citron Pill*, and a little *Saffron*, have been intuse. may be alwayes worn upon the stomach. And touching those things which comfort the stomach, thus much: Seeing many of those things also which serve for other operations, are helpfull to this.

The *Liver*, if it be preserved from *Torrefaction*, or *Desiccation*, and from *Obstruction*, it needeth no more: For that loosenesse of it which begets *Aquosities*, is plainly a Disease; but the other two, old age approaching induceth.

Hereunto appertain most especially, those things which are set down in the *Operation* upon the *blood*: we will adde a very few things more, but those selected.

Principally let there be in use the wine of sweet *Pomegranates*: or if that cannot be had, the juyce of them newly expressed; let it be taken in the morning, with a little *Sugar*: And into the glasse, into which the Expression is made, put a small peece of *Citron pill* green, and three or four whole *Cloves*: Let this be taken from *February*, till the end of *April*.

Bring also into use, above all other herbs, *water cresses*; but young, not old: They may be used either raw, in *Sallets*, or in *Broaths*, or in *Drinks*: And after that take *Spoon wort*.

Aloes, howsoever washed or corrected, is hurtfull for the *Liver*: And therefore it is never to be taken ordinarily. Contrariwise, *Rhubarb* is soveraign for the *Liver*; So that these three cautions be interposed. First, that it be taken before meat, lest it dry the body too much, or leave some impressions of the *Stipticity* thereof. Secondly, that it be macerated an hour or two in oyle of sweet *Almonds* new drawn, with *Rose-water*, before it be infused in liquor, or given in the proper substance. Thirdly, that it be taken by turns, one while simple, another while with *Tartar*, or a little *Bay Salt*; That it carry not away the lighter parts only, and make the masse of the *Humours* more obstinate.

I allow wine, or some decoction with *steel* to be taken three or four times in the year, to open the more strong obstructions; yet so, that a draught of two or three spoonfulls of oyl of sweet *Almonds* new drawn, ever goe before; and the motion of the body, especially of the *Armes* and *Sides*, constantly follow,

Sweetened liquors, and that with some fatness, are principally, and not a little effectual to prevent the *Arefaction*, and *Saltiness*, and *Torrefaction*, and in a word, the *Oldnesse* of the *Liver*; especially if they be well incorporated with age: They are made of sweet *Fruits* and *Roots* as namely, the *Wines* and *Julips*, of *Rasins* of the *Sun* new, *Jujubes*, dried *Figs*, *Dates*, *Parships*, *Potatoes*, and the like, with the mixture of *Licorish* sometimes: Also a *Julip* of the *Indian* grain (which they call *Maiz*) with the mixture of some sweet things, doth much to the same end. But it is to be noted That the intention of preserving the *Liver*, in a kind of Softness, and Farnesse, is much more powerfull than that other, which pertaines to the opening of the *Liver*; which rather tendeth to health than to length of life, saving that that *Obstruction* which induceth *Torrefaction*, is as opposite to long life, as those other *Arefactions*.

I commend the *Roots* of *Succory*, *Spinage*, and *Beets* cleared of their piths, and boiled till they be tender, in water, with a third part of white wine, for ordinary *sallets*, to be eaten with *Oyl* and *Vinegar*: Also *Asparagus*, pith of *Arichoakes*, and *Burre* roots boiled and served in after the same manner: Also broaths in the Spring time, of *Vise-buds*, and the green blades of *Wheat*. And touching the preserving of the *Liver*, thus much.

The *Heart* receiveth benefit or harm most from the *Air*, which we breath; from *Vapours*, and from the *Affections*. Now many of those things which have been formerly spoken touching the *Spirits*, may be transferred hither: but that indigested masse of *Cordials* collected by *Physicians*, availes little to our *Intention*: Notwithstanding those things which are found to be good against *poysons*, may with good judgement be given to strengthen and fortifie the *Heart*, especially if they be of that kind, that they doe not so much resist the particular *poysons*, as arm the *Heart* and *Spirits* against *poysen* in general. And touching the severall *Cordials*, you may repair to the *Table* already set down.

The goodnesse of the *Air* is better known by experience than by signs. We hold that air to be best, where the *Country* is level and plain; and that lyeth open on all sides: so that the soil be dry, and yet not barren or sandy: which puts forth

Wilde Trime, and *Eye-bright*, and a kind of *Marjoram*, and here it talks of *Calamint*: which is not altogether void of wood, but conveniently set with some trees for shade: where the *Sweet-bryer-rose* smelleth something Musky, and Aromatically; If there be *Rivers*, we suppose them rather hurtfull than good, unlesse they be very small, and clear, and gravelly.

28 It is certain, that the *morning Air* is more lively and refreshing, than the *evening air*, though the latter be preferred out of delicacy.

29 We conceive also, that the *Air stirred* with a *gentle wind*, is more wholesome than the *Air of a serene and calm skie*: but the best is, the *wind blowing from the West* in the morning, and from the *North* in the Afternoon.

30 *Oudours* are especially profitable for the comforting of the *Heart*: yet not so, as though a good *odour* were the prerogative of a good *Air*: For it is certain, that as there are some *Pestilent all Airs*, which smell not so ill as others that are lesse hurtfull; so on the contrary, there are some *Airs* most wholesome and friendly to the *Spirits*, which either smell not at all, or are lesse pleasing and fragrant to the sense. And generally, where the *Air* is good, *odours* should be taken but now and then: for a continuall *O-dour*, though never so good, is burthensome to the *Spirits*.

31 We commend above all others (as we have touched before) *odour of plants growing, and not plucked, taken in the open Air*; the principall of that kind are *Violets*, *Gilliflowers*, *Pinks*, *Bean-flowers*, *Lime-tree blossoms*, *Vine-buds*, *Hony-suckles*, *Yellow Wall-flowers*, *Musk-Roses*; (for other *Roses* growing, are fast of their smells) *Strawberry-leaves* especially *ding*; *sweet Bryar*, princially in the early Spring, *wild Mint*, *Lavender flower*: And in the hotter Countries, *Orange-tree*, *Citron-tree*, *Mirtle*, *Lavrell*: Therefore to walk, or sit, near the breath of these *Plants*, would not be neglected.

32 For the comforting of the *Heart*, we prefer cool smells before hot smells: Therefore the best perfume is, either in the morning, or about the heat of the day, to take an equal portion of *Vinegar*, *Rose water*, and *Claret wine*, and to pour them upon a *Fire-pan* somewhat heated.

33 Neither let us be thought to sacrifice to our Mother the *Earth*; though we advise, that in *Digging*, or *Plowing the Earth*, for health, a quantity of *Claret wine* be powdered thereon.

34 *Orange flower water*, pure and good, with a small portion of *Rose-water*, and *Brisk wine*, inhaled up into the nostrils, or put up into the nostrils with a *Syringe*, after the manner of an *Errhine*; but not too frequently) is very good.

35 But *Champing* (though we have no *Betel*,) or holding in the mouth only of such things as cheer the *Spirits*, (even daily done) is exceeding comfortable. Therefore for that purpose make *Grains*; or little *Cakes*, of *Amber-grise*, *Musk*, *Lignum*, *Aloes*, *Lignum Rhodium*, *Orris*, *powder*, and *Roses*; and let those *Grains*, or *Cakes*, be made up with *Rose-water*, which hath passed through a little *Indian Balsame*.

36 The *Vapours* which arising from things inwardly taken, do fortifie and cherish the *Heart*, ought to have these three properties; That that be *Friendly*, *Clear*, and *Cooling*. For hot *vapours* are Nought; and *wine* itself, which is thought to have only an heating *vapour*, is not altogether void of an *Opiate quality*. Now we call those *vapours* *Clear*, which have more of the *vapour*, than of the *Exhalation*; and which are not smoaky, or fuliginous, or unctuous; but moist, and equal.

37 Out of that unprofitable Rabble of *Cordials*, a few ought to be taken into daily diet: In stead of all, *Amber-grise*, *Saffron*, and the grain of *Kermes*, of the hotter sort: *Roots of Buglosse*, and *Borage*, *Citrons*, *sweat Limons*, and *Permaines*, of the colder sort. Also that way which we said, both *Gold* and *Pearls*, work a good effect, not only within the veins, but in their passage, and about the parts near the heart; aNely by cooling, without any malignant quality.

38 Of *Bezoar stone*, we believe well, because of many trials: but then the manner of taking it, ought to be such, as the virtue thereof may be more easily be communicated to the *Spirits*. Therefore we approve not the taking of it in *broaths*, or *syrups*, or in *Rose-water*, or any such like; but only in *Wine*, *Cinnamon-water*, or the like distilled water, but that, weak, or small, not burning, or strong.

39 Of the *Affections* we have spoken before, we only add this, That every *Noble*, and *Resolute*, and (as they call it) *Heroicall Desire*, strengtheneth and enlargeth the powers of the *heart*. And touching the *heart*, thus much.

As for the *Brain*, where the seat, and Court of the *Animall Spirits*, is kept: Those Things which were inquired before, touching *Opium*, and *Nitre*, and the *Subordinates* to them both; Also touching the *procuring of Placide Sleep*; May likewise be referred hither. This also is most certain; That the *Brain* is in some sort, in the Custody of the *Stomach*; And therefore those Things, which comfort, and strengthen the *Stomach*, doe help the *Brain*, by Consent; And may, no lesse, be transferred hither. We will add a few Observations; Three Outward, one Inward.

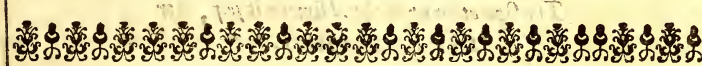
We would have *Bathing of the Feet*, to be often used; At least, once in the weak; And the *Bath* to be made, of *Lye*, with *Bay salt*, And a little *Sage*, *Camomile*, *Fennell*, *Sweet-Marjoram*, and *Pepper-wort*, with the Leaves of *Angelica*, green.

We commend also, a *Fume*, or *Suffumigation*, every Morning, of dried *Rose-Mary*, *Bay-leaves* dried, and *Lignum Aloes*: For all *Sweet Gums*, oppresse the *Head*.

Especially Care must be taken, that no *Hot Things* be applied to the *Head* outwardly; Such are all kind of *Spices*, the very *Nutmeg* not excepted: For those *Hot Things*, we debase them to the soles of the *Feet*, and would have them applied there only: But a light anointing of the *Head* with *Oyl*, mixed with *Roses*, *Myrtle*: and a little *Salt*; and *Saffron*, we much commend.

Not forgetting those Things, which we have before delivered, touching *Opiates*, *Nitre*, and the like, which so much *condense* the *Spirits*; we think it not impertinent to that Effect: That once in fourteen dayes, Broath be taken, in the Morning, with three, or four Grains of *Castoreum*, and a little *Angelica Seed*, and *Calomus*; Which both fortifie the *Trin*; And in that aforesaid Density, of the Substance, of the *Spirits*, (so necessary to Long Life;) Add also a *Vivacity* of *Motion*, and *Vigour* to them.

In handling, the *Comforters*, of the four *Principal Bowels*, we have propounded those Things, which are both proper, and choice, and may safely, and conveniently be transferred into *Dies*, and Regiment of *Life*: for Variety of *Medicines*, is the *Daughter of Ignorance*; And it is not more true, That *Many Dishes have caused many Diseases*, As the *Proverb* is; Then, this is true, That any *Medicines* have caused few *Cures*. And touching the *Operation* upon the *Principall Bowels*, for their *Extrusion*, of *Aliment*, thus much.



The Operation upon the Outward Parts, for their Attraction of Aliment. 6.

The History.



Although a good *Concoction*, performed by the *Inward Parts*, be the principal, towards a perfect *Alimentation*; yet the *Actions* of the *Outward Parts*, ought also to concurr; That like as the *Inward Faculty*, sendeth forth, and extrudeth the *Aliment*, so the *Faculty* of the *Outward Parts*, may call forth, and attract the same; And the more weak the *Faculty of Concoction*, shall be, the more need is there of a concurring Help, of the *Attractive Faculty*.

A *Strong Attraction* of the *Outward Parts*, is chiefly caused by the *Motion* of the *Body*; By which, the *Parts* being *Heated* and *Comforted*, do more cheerfully call forth and attract the *Aliment* unto themselves.

But this is most of all to be foreseen and avoided, that the same *Motion* and *Heat*, which calls the new *Juyce* to the *Members*, doth not again dispoil the *Member* of that *Juyce*, wherewith it had been before refreshed.

Frications used in the Morning, serve especially to this *Intention*; But this must evermore accompany them, that after the *Frication*, the *Part* be lightly anointed with *Oyl*, lest the *Attrition* of the *Outward Parts*, make them by *Perspiration*, *Dry*, and *Juyce-lesse*.

The next is *Exercise*, (by which the parts confiticate, and chase themselves,) so it be

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be Moderate; And which, (as was noted before,) be not Swift, nor to the utmost Strength, nor unto Wearineſſe. But in Exercise, and in Friction, there is the ſame Reason and Caution, that the body may not periſpire, or exhale too much: Therefore Exercise is better in the open Air, than in the Houſe; And better in Winter, than in Summer: and again, exerciſe is not only to be concluded with Unction, As Friction is: But in vehement Exercises, Unction is to be uſed both in the beginning, and in the end; As it was anciently to *Champions*.

6 That Exercise, may reſolve, either the Spirits, or the Juices, as little as may be, it is neceſſary that it be uſed when the Stomach is not altogether empty. And therefore, that it may not be uſed upon a full Stomach, (which doth much concern Health;) Nor yet upon an empty Stomach (which doth no leſſe concern Long Life,) it is better to take a Breakfast in the Morning; Not of any Phyſicall Drugs, or of any Liquors, or of Raiſins, or of Figs, or of the like; But of plain Meat, and Drink; yet that very light, and in moderate Quantity.

7 Exercises, uſed for the Irrigation of the Members, ought to be equal to all the Members: Not, (as *Socrates* ſaid) that the Legs ſhould move, and the Arms ſhould reſt; Or on the contrary; But that all the parts may participate of the motion. And it is alſo good to reſiſt to long Life, that the Body ſhould never abide long in one poſture, but that every halfe houre, at leaſt, it change the poſture, ſaving only in ſleep.

8 Thoſe things which are uſed to *Mortification*, may be transferred to *Vivification*: For both Hair ſhirts, and Scourings, and all vexations of the outward parts, doe ſo ſtrike the Attractive force of them.

9 *Cardan* commends *Netting*, Even to let out *Melancholly*: But of this we have no Experience; And beſides, we have no good opinion of it, leſt through the venomous Quality of the *Nettle*, it may with often uſe, breed Itches, and other Diſeaſes of the Skin. And touching the Operation, upon the Outward Parts, for their Attraction of Aliment, thus march.



The Operation upon the Aliment it ſelf, for the Inſinuation thereof. 7.

The Hiſtory.



1 He vulgar Reproof, touching many Diſhes, doth rather become a ſevere Reformer, than a Phyſician; Or howtoever it may be good for Preſervation of Health, yet it is hurtful to Length of Life: By reaſon that a various mixture of Aliments, and ſomewhat Heterogeneous, findes a paſſage into the veins and juices of the Body more lively and cheerfully than a Simple, and Homogeneous Diet doth: Beſides, it is more forcible, to ſtir up Appetites, which is the Spirit of Diſtention. Therefore we allow, both a Full Table, and a continual changing of Diſhes, according to the Seaſons of the year, or upon other occaſions.

2 Alſo that Opinion, of the Simplicity of Meats, without Sauces, is but a ſimplicity of Judgement: for good, and well choſen Sauces, are the moſt wholeſome preparation of Meats, and conduce both to Health, and to long Life.

3 It muſt be order'd that with Meats hard of Diſtention, be conjoynd ſtrong Liquors, and Sauces that may penetrate, and make way: But with Meats more eaſie of Diſtention ſmaller Liquors, and Fat Sauces.

4 Whereas we adviſed before, that the firſt Draught at ſupper ſhould be taken warm; Now we add, that for the preparation of the Stomach, a good Draught of that Liquor (to which every man is moſt accuſtomed) be taken warm halfe an houre before Meat alſo; but a little ſpiced to pleaſe the Taſte.

5 The preparation of Meats, and Breads, and Drinks, that they may be rightly handled, and in order to this Intention; Is of exceeding great Moment: Howtoever it may ſeem a Mechanical thing, and favouring of the Kitchen, and Buttry: Yet it is of more conſequence, than thoſe Fables, of Gold, and Precious Stones, and the like.

The Moistning of the Iuyces of the Body, by a moist preparation of the Aliments, is a childish thing: It may be somewhat available against the Fervours of Diseases; But it is altogether averle to Roscide Alimentation. Therefore boyling of Meats, as concerning our Intention, is far Inferiour to Roasting and Baking, and the like.

Roasting ought to be with a quick fire, and soon dispatched; Not with a dull fire, and in long time.

All Solide Fleshes, ought to be served in, not altogether Fresh, but somewhat powdered, or corned: The less Salt may be spent at the Table with them, or none at all; For Salt incorporated with the Meat before, is better distributed in the Body, than eaten with it at the Table.

There would be brought into use severall and good *Macerations*, and *Infusions* of Meats, in convenient Liquors, before the Roasting of them: The like whereof are sometime in use before they bake them; And in the Pickles of some Fishes.

But *Beatings*, and as it were *Scourings* of Flesh Meats, before they be boyled, would work no small matter. We see, it is confessed that *Partridges* and *Pheasants*, killed with an *Hawke*; Also *Bucks* and *Stags* killed in Hunting; (If they stand not out too long) eat better, even to the Taste. And some Fishes, scoured and beaten, become more tender, and wholsome. Also hard, and sowre *Pears*, and some other Fruits, grow sweet with rowling them. It were good to practise some such Beating and Bruising, of the harder kinds of Fleshes, before they be brought to the Fire. And this would be one of the best preparations of all.

Bread, a little leavened, and very little salted, is best: And which is baked in an oven, thorowly heated, and not with a faint heat.

The Preparation of Drinks in order to long Life, shall not exceed one precept. And as touching *Water Drinkers*, we have nothing to say, Such a Dyet (as we said before) may prolong life to an Indifferent Term, but to no Eminent length: But in other Drinks, that are full of Spirit (such as are *Wine*, *Ale*, *Mead*, and the like) this one thing is to be observed, and pursued, as the sum of all; That the parts of the *Liquour* may be exceeding Thin and Subtile; And the *Spirit* exceeding Mild: This is hard to be done by *Age* alone; For that makes the parts a little more subtile; But the Spirits much more sharp and eager: Therefore of the *Infusions* in the vessels, of some fat Substance, which may restrain the Acrimony of the Spirits, counsell hath been given before: There is also another way without *Infusion*, or *Mixture*: this is, that the *Liquour* might be continually agitated; Either by carriage upon the water, or by carriage by Land; or by hanging the vessels upon lines, and daily stirring them; or some such other way: For it is certain, that this *local Motion*, doth both subtilize the parts And doth so incorporate, and compact the Spirits with the parts; That they have no leisure to turn to sowrenesse, which is a kind of *Purification*.

But in extreme *old Age*, such a preparation of Meats is to be made, as may be almost in the Middle-way to *Chylus*; And touching the *Distillations* of Meats, they are meer Toyes: For the Nutritive part, at least the best of it, doth not ascend in *Vapours*.

The Incorporating of Meat and Drink before they meet in the Stomach is a degree to *Chylus*; Therefore let *Chickens*, or *Partridges*, or *Pheasants*, or the like, be taken, and boyled in water, with a little salt; then let them be cleaned and dried; Afterward let them be infused in *Must*, or *Ale* before it hath done working, with a little *Sugar*.

Also *Grazies* of Meat, and the *Mincings* of them small, well seasoned; Are good for *old Persons*; And the rarer, for the they are destituted of the office of their *Teeth*, in chewing, which is a principal kind of preparation.

And as for the Helps of that Defect, (Namely, of the strength of *Teeth* to grind the Meat,) There are three things, which may conduce thereunto. First, that new *Teeth* may put forth; That which seems altogether difficult, and cannot be accomplished, without an Inward, and powerfull Restauration of the body. Secondly, that the *Jaws* be so confirmed by due *Astringents*, that they may in some sort supply the office of the *Teeth*; which may possibly be effected. Thirdly, that the Meat be so prepared, that there shall be no need of chewing; which remedy is ready, and at hand.

We have some thought also touching the *Quantity*, of the meat and drink; that the same taken in larger *Quantity*, at some times, is good for the *Irrigation* of the *Body*. Therefore both *Great Feastings*, and *Free Drinkings* are not altogether to be inhibited. And touching the *Operations* upon the *Aliments*, and the *Preparation* of them, thus much.

The Operation upon the last Act of Assimilation. 8.

Touching the last Act of Assimilation, (unto which the three Operations, immediately preceding, chiefly tend) our Advice shall be brief and single And the thing it self, rather needs Explication, than any various Rules.



LT is certain, that all Bodies are endued with some desire of *Assimilating* those things which are next them: this the Rare and Pneumatical Bodies, as *Flame, Spirit, Air*, perform generously, and with alacrity; On the contrary, those that carry a grosse, and tangible bulk about them, do but weakly: In regard, that the Desire of *Assimilating* other Things, is bound in by a stronger desire of Rest, and containing themselves from *Motion*.

Again, it is certain, That desire of *Assimilating*, being bound, as we said, in a Grotte by, and made uneffectual; is somewhat freed. and stirred up, by the *Heat* and *Neighbouring Spirit*; So that it is then *Attuated*: which is the only cause why *Inanimates Assimilate* not, and *Animates Assimilate*.

This also is certain, that the harder the Consistence of the Body is; the more doth that Body stand in need of a greater Heat, to prick forward the *Assimilation*: Which falls out ill for old Men; because in them the parts are more obstinate, and the heat weaker: And therefore, either the obstinacy of their parts is to be softened, or their heat increased. And as touching the *Malaciffation*, or *Mollifying* of the Members, we shall speak afterward; Having also formerly propounded many things, which pertain to the prohibiting and preventing of this kind of hardness. For the other, touching the Increasing of the heat, we will now deliver a single precept: After we have first assumed this *Axiome*.

The *Act of Assimilation*, which, as we said, is excited by the Heat circumsufed, is a Motion exceeding Accurate, Subtile, and in Little. Now all such Motions do then come to their Vigour, when the *Local Motion* wholly ceaseth, which disturbeth it. For the *Motion of Separation*, into *Homogeneous* parts, which is in Milk; That the Cream should Swim above, and the Whey sink to the bottom, will never work, if the Milk be never so little agitated: Neither will any *Putrefaction* proceed in Water or Mixt Bodies, if the same be in continual *Local Motion*. So then, from this *Assumption*, we will conclude this for the present Inquisition.

The *Act* it self, of *Assimilation*, is chiefly accomplished in Sleep and Rest; Especially towards the Morning, the Distribution being finished: therefore we have nothing else to advise, but that Men keep themselves hot in their Sleep: And further, that towards the Morning there be used some Anointing, or Shirt tinged with Oyl, such as may gently stir up heat; And after that, to fall asleep again. And touching the last Act of *Assimilation*, thus much.



The Operation upon the Inteneration of that, which begins to be Arified; Or the Malaciffation of the Body. 9.

WE have inquired formerly, touching the Inteneration from within; which is done by many Windings, and Circuits, as well of Alimentation, as of Detaining the Spirit from issuing forth; and therefore is accomplished slowly: Now we are to inquire touching that Inteneration, which is from without; And is effected, as it were, suddenly; Or touching the Malaciffation, and Supplying of the Body.

The History.

IN the Fable of restoring Pelias to Youth again, Medea when she seigned to do it, propounded this way, of accomplishing the same; That the Old Mans body should be cut into several Peeeces; And then boyled in a Cauldron, with certain Medicaments. There may, perhaps, some boyling be required to this matter; but the cutting into pieces is not needfull.

Notwithstanding this cutting into pieces seems, in some sort, to be usefull; Not with a Knife, but with Judgement. For whereas the Consistence of the *Bowels*, and *Parts* is very divers; It is needfull that the *Inteneration* of them both be not effected the same way; but that there be a Cure designed of each in particular; Besides those things which pertain to the Inteneration of the whole Masse of the Body; Of which, notwithstanding, in the first place.

This *Operation*, (if perhaps it be within our power) is most likely to be done by Baths, Unctions, and the like: Concerning which these things that follow, are to be observed.

We must not be too forward in hoping to accomplish this matter from the Examples of those Things which we see done in the *Imbibitions*, and *Macerations* of *Inanimates*; By which they are intenerated: whereof we introduced some Instances before: For this kind of operation is more easie upon *Inanimates*, because they attract and suck in the Liquor; But upon the Bodies of Living Creatures it is Harder; because in them the Motion rather tendeth outward, and to the *Circumference*.

Therefore the *Emollient Baths* which are in use, do little good, but on the contrary, hurt; because they rather draw forth, than make entrance; And resolve the structure of the Body, rather than consolidate it.

The *Baths* and *Unctions*, which may serve to the present *Operation*; (Namely, of *Intenerating the Body*, truly, and really,) ought to have three properties.

The first and Principal, is; That they consist of those *Things* which in their whole Substance, are like unto the *Body* and *Flesh* of *Man*; And which have a *Feeding*, and *Nursing* Vertue from without.

The Second is, That they be mixed with such things as through the *Subtily* of their *Parts* may *Make Entrance*, and so insinuate, and conveigh their *Nourishing Vertue* into the *Body*.

The Third is, That they receive some *Mixture* (though much inferiour to the rest) of such things as are *Astringent*; I mean not *Sowre*, or *Tart* things, but *Unctuous* and *Comforting*; That while the other two do operate, the Exhaling out of the *Body*, which destroyeth the Vertue of the Things *Intenerating*, may (at much as is possible) be prohibited; And the Motion to the *Inward Parts*, by the *Astriction* of the skin, and closing of the *Passages*, may be promoted and furthered.

That which is most *Consubstantial* to the *Body* of *Man*, is *Warm Blood*, either of *Man*, or of some other living *Creature*: But the device of *Ficinus*, Touching the Sucking of *Blood* out of the *Arm* of a wholesome young *Man*, For the *Restauration* of *Strength* in *Old men*, is very frivolous; For that which nourisheth from within, ought no way to be equal, or *Homogeneous* to the *Body* nourished; But in some sort, *Inferiour*, and *Subordinate*, that it may be converted: But in Things applied outwardly, by how much the *Substance* is *Liker*, by so much the *Consent* is better.

It hath been anciently received, That a *Bath* made of the *Blood* of *Infants* will cure the *Leprosie*, and heal the *Flesh* already putrified: Inasmuch that this thing hath begot *Envy* towards some *Kings* from the *Common people*.

It is reported, that *Heraclitus* for cure of the *Dropsie*, was put into the *Warm Belly* of an *Oxe* newly slain.

They use the *blood* of *Kittins* warm, to cure the *Disease* called *Saint Antonies Fire*; And to restore the *Flesh* and *Skin*.

An *Arm*, or other *Member* newly cut off; Or that upon some other occasion will not leave *bleeding*, is, with good successe, put into the *belly* of some *Creature* newly *ripped up*: For it worketh potently to *Stanch* the *Blood*; The *blood* of the *member* cut off, by consent sucking in, and vehemently drawing to it self the *Warm blood* of the *Creature* slain; whereby it self is stopped, and retireth.

It is much used in extreme and desperate *Diseases*, to cut in two young *Pidgeons*, yet living, and apply them to the *Soles* of the *Feet*: and to shift them one after another, whereby sometime there followeth a wonderfull ease. This is imputed vulgarly as if they should draw down the *Malignity* of the *Disease*; But howsoever this Application goeth to the *Head*, and comforteth the *Animal Spirits*.

But these *Bloody Baths* and *Unctions* seem to us flatrish and odious: Let us search out some others, which perhaps have lesse loathsomenesse in them, and yet no lesse Benefit.

- 17 Next unto *Warm-blood*, Things alike in Substance, to the Body of a Man, are *Nutritives*; *Fat Fleesh*, of *Oxen*, *Swine*, *Deer*: *Oysters* amongst *Fishes*; *Milk*, *Butter*, *yolks of Eggs*: *Flour* of *Wheat*, *Sweet Wine*, either *Sugred*, or before it be fined.
- 18 Such things as we would have mixed to make Impression are, in stead of all; *Salts*, especially *Bay-salt*; *Allo Wine* (when it is full of Spirit,) maketh Entrance; And is an excellent Convoy.
- 19 *Astringents* of that kind, which we described; Namely *Unctuous* and *Comfortable* things are, *Saffron*, *Mastick*, *Myrrh*, and *Myrtle-Berries*.
- 20 Of these Parts, in our Judgment, may very well be made such a *Bath* as we design: *Physicians* and *Posterity* will find out better things hereafter.
- 21 But the *Operation* will be much better, and more powerfull, If such a *Bath* as we have propounded (which we hold to be the principal Matter) be attended with a *Four-fold Course* and *Order*.
- 22 First, that there go before the *Bath*, a *Frication* of the Body; And an *Anointing* with *Oyle*, with some thickning Substance: That the Vertue, and Moistning heat of the Bath may pierce the Body, and not the watry part of the Liqueur. Then let the *Bath* follow, for the space of some two Hours: After the *Bath*, let the *Body* be *Emplastrated* with *Mastick*, *Myrrh*, *Tragacanth*, *Diapalma*, and *Saffron*; That the *Perspiration* of the Body, may (as much as is possible) be inhibited; Till the *Supple Matter* be by degrees turned into *Solid*: This to be continued, for the space of twenty four hours, or more. Lastly, the *Emplastring* being removed, let there be an *Anointing* with *Oyle*, mixed with *Salt* and *Saffron*. And let this *Bath*, together with the *Emplastring* and *Unction* (as before) be renewed every fifth day: This *Malaciffation*, or *Suppling* of the Body, to be continued for one whole Month.
- 23 Also during the time of this *Malaciffation*, we hold it usefull and proper, and according to our intention, that men nourish their bodies well, and keep out of the cold Air, And drink nothing but warm Drink.
- 24 Now this is one of those Things; (as we warned, in general in the beginning) whereof we have made no Trial by *Experiment*; but only set it down, out of our Aiming and Levelling at the End. For having set up the Mark, we deliver the Light to others.
- 25 Neither ought the *Warmths* and *Cherishings* of *Living Bodies*, to be neglected. *Ficinus* saith, and that seriously enough, *That the Lying of the young Maid in Davids Bosome, was wholesome for him, but it came too late*. He should also have added, That the young Maid, after the manner of the *Persian Virgins*, ought to have been anointed with *Myrrh*, and such like; Not for deliciousness, but to increase the vertue of this Cherishing by a living Body.
- 26 *Barbarea*, in his extreme old Age, by the advice of a *Physician*, a *Jew*, did continually apply young Boys, to his Stomach and Belly, for *Warmth* and *Cherishing*: Also some Old men lay *Whelps* (Creatures of the hottest kind) close to their Stomachs every night.
- 27 There hath gone a report, almost undoubted; And that under several Names; Of certain men that had great *Noses*, who being weary of the derision of people, have cut off the Bunches or Hillocks of their *Noses*; And then making a wide Gash in their Arms, having held their *Noses* in the place for a certain time; And so brought forth fair and comely *Noses*: Which if it be true, it shews plainly, the *Consent* of *Flesh* unto *Flesh*, especially in *Live Fleesh*.
- 28 Touching the particular *Inteneration* of the *Principal Bowel*; The *Stomach*, *Lungs*, *Liver*, *Heart*, *Bram*, *Marrow* of the *Backbone*, *Guts*, *Reins*, *Gall*, *Veins*, *Arteries*, *Nerves*, *Cartilags*, *Bones*; The *Inquisition* and *Direction*, would be too long; Seeing we now set not forth a *Practique*; But certain *Indications* to the *Practique*.

The Operation upon the Purgings away of old Juice, and Supplying of new Juices; Or of Renovation by Turns. 10.

The History.



Although those things which we shall here set down, have been, for the most part, spoken of before; yet because this Operation is one of the principall, we will handle them over again, more at large.

It is certain, that *Draught Oxen*, which have been worn out with working, being put into fresh, and rich pastures, will gather tender and young flesh again; And this will appear, even to the Taste and Palate; so that the *Inteneration of Flesh*, is no hard Matter. Now it is likely, that this *Inteneration of the Flesh*, being often repeated, will in time reach to the *Inteneration of the Bones and Membranes*, and like *Parts* of the *Body*.

It is certain, that Diets which are now much in use; Principally of *Guaicum*, and of *Sarsaparilla*, *Cbina*, and *Sassafras*; If they be continued for any time, and according to strict Rules; Doe first *Attenuate* the whole Juice of the Body; And after consume it, and drink it up. Which is most manifest, because that by these Diets, the *French Pox*, when it is grown even to an hardnesse, and hath eaten up, and corrupted the very Marrow of the Body, may be assuredly cured. And further, because it is as manifest, that Men, who by these Diets, are brought to be extreme Lean, Pale, and as it were Ghosts, will soon after become Fat, well-coloured, and apparently Young again. Wherefore we are absolutely of opinion, that such kind of Diets in the decline of age, being used every year, would be very usefull to our Intention; Like the old Skin, or Spoil of *Serpens*.

We do confidently affirm, (neither let any man reckon us amongst those *Hereticks*, which were called *Cathari*;) that often *Purges* and made even Familiar to the Body, are more available to long Life, than *Exercises* and *Sweats*. And this mu't needs be so, if that be held, which is already laid for a ground; That Unctions of the Body, and Opletion of the passages from without, and Exclusion of Air, and detaining of the Spirit, within the Masse of the Body, do much conduce to long Life. For it is most certain, that by *Sweats* and outward *Perpirations*; not only the Humours and excrementitious Vapours are Exhaled and consumed; But together with them, the Juices also, and good Spirits, which are not so easily repaired; But in *Purges* (unless they be very immoderate,) it is not so; Seeing they work principally upon the *Humours*. But the best *Purges* for this Intention, are those, which are taken immediately before Meat: Because they dry the Body lesse, And therefore, they must be of those *Purgers*, which do least trouble the Belly.

These Intentions, of the Operations, which we have propounded (as we conceive) are most true; The Remedies Faithfull to the Intentions. Neither is it credible to be told (Although not a few of these Remedies may seem but vulgar) with what Care and Choice they have been examined by us; That they might be (the Intention not at all impeached) both Safe and Effectuall. Experience, no doubt, will both verifie, and promote these Matters. And such, in all things, are the Works of every prudent Counsell; That they are Admirable in their Effects, Excellent also in their Order, but seeming vulgar in the Way and Means.



The Porches of Death!

WE are now to inquire touching the Porches of Death; That is, touching those things which happen unto men at the point of Death; Both a little before, and after. That seeing there are many Paths, which lead to Death, it may be understood in what Common-

way; they all end; Especially in those Deaths, which are caused by Indigence of Nature, rather than by violence; Although something of this latter also, must be inserted, because of the Comexion of Things.

The History.



1 **T**HE Living Spirit stands in need of three things, that it may subsist: Convenient Motion, Temperate Refrigeration, and Fit Aliment. Flame seems to stand in need but of two of these; Namely, Motion, and Aliment: Because Flame is a simple substance, the Spirit a Compound: Inſomuch, that if it approach somewhat too near to a Flamy Nature, it overthroweth it ſelf.

2 Also Flame by a greater and ſtronger Flame is extinguished and ſlain; As *Aristotle* well noted, much more the Spirit.

3 Flame if it be much compressed and ſtraightned, is extinguished; As we may ſee in a Candle having a Glaſſe caſt over it; For the Air being dilated by the heat, doth contrude and thruſt together the Flame; And ſo leſſeneth it, and in the end extinguisheth it: And Fires on hearths will not Flame, if the Fewel be thruſt cloſe together without any ſpace for the Flame to break forth.

4 Also things fired are extinguished with compression: As if you preſſe a burning coal heard with the Tongſ, or the Foot, it is ſtraight extinguished.

5 But to come to the Spirit; If Blood or Flegm get into the Ventracles of the Brain, it cauſeth ſudden Death; Because the Spirit hath no Room to move it ſelf.

6 Also a great Blow on the Head, induceth ſuddain Death, the Spirits being ſtraightned within the Ventracles of the Brain.

7 *Opium*, and other ſtrong *Sinepſactives*, doe coagulate the Spirit, and deprive it of he Motion.

8 A *Venemous Vapour*, totally abhorred by the ſpirit, cauſeth ſuddain Death: As in deadly poiſons, which work (as they call it) by a ſpecificall Malignity: For they ſtrike a loathing into the Spirit, that the Spirit will no more move it ſelf, nor riſe againſt a thing ſo much detested.

9 Also extreme Drunkenneſſe, or extreme Feeding, ſometime cauſe ſudden Death: Seeing the Spirit is not only Oppreſſed with overmuch *Condensing*, or the malignity of the Vapour (as in *Opium*, and malignant Poiſons) but alſo with the abundance of the Vapours.

10 Extreme Grief, or Fear, eſpecially if they be ſudden (as it is in a ſad, and unexpected Meſſage) cauſe ſudden Death.

11 Not only over-much Compression, but alſo over-much Dilatation of the Spirit, is Deadly.

12 Joyes exceſſive and ſudden have bereft many of their lives.

13 In great Evacuations, as when they cut men for the *Dropſie*, the waters flow forth abundantly; Much more in great and ſudden Fluxes of Blood ſometimes preſent Death ſolloweth: And this happens by the meer flight of *Vacuum* within the Body; All the parts moving to fill the Emptie places; And amongst the reſt, the Spirit's hemſelves. For as for ſlow Fluxes of Blood, this matter pertains to the Indigence of Nourishment, not to the Diſuſion of the Spirits. And touching the Motion of the Spirit, ſo far, either Compressed or Diſſolved, that it bringeth Death, thus much.

14 We muſt come next to the want of Refrigeration. Stopping of the breath cauſeth ſudden Death: As in all ſuffocation, or ſtrangling. Now it ſeems this matter is not ſo much to be referred to the Impediment of motion, as to the Impediment of Refrigeration: For Air over-hot, though attracted freely, doth no leſſe Suffocate than if Breathing were hindered: as it is in them, who have been ſometime ſuffocated with Burning coales, or with Charcole, or with Walls newly plaiſtered, in cloſe chambers, where a fire is made: which kind of death is reported to have been the end of the Emperour *Iovinian*: The like happeneth from dry Baths over-heated; which was practiſed in the killing of *Fauſta*, wife to *Conſtantine* the Great.

15 It is a very ſmall time, which Nature taketh, to repeat the Breathing; And in which

which she desireth to expell the foggy air drawn into the *Lungs*, and to take in new; scarce the third part of a minute.

Again, the beating of the *Pulse*, and the motion of the *Systole*, and *Diastole* of the Heart, are three times quicker than that of breathing; insomuch that if it were possible that that motion of the heart could be stopped, without stopping the breath, Death would follow more speedily thereupon, than by strangling.

Notwithstanding use and custom prevail much in this natural action of breathing, as it is in the *Delian Divers*, and *Fishers* for pearl; who by long use can hold their breaths at least ten times longer than other men can doe.

Amongst living Creatures, even of those that have *Lungs*, there are some that are able to hold their breaths a long time, and others that cannot hold them so long; according as they need, more or lesse Refrigeration.

Fishes need lesse Refrigeration than *Terrestrial Creatures*, yet some they need, and take it by their Gills. And as *Terrestrial Creatures* cannot bear the Air that is too Hot, or too Close; So *Fishes* are suffocated in waters, if they be totally and long frozen.

If the Spirit be assaulted by another heat greater than it self, it is dissipated, and destroyed. For it cannot bear the proper heat without Refrigeration, much lesse can it bear another heat which is far stronger. This is to be seen in *burning Fevers*, where the heat of the purified humours doth exceed the native heat even to extinction, or dissipation.

The want also, and use of *Sleep*, is referred to Refrigeration. For motion doth attenuate and rarifie the Spirit, and doth sharpen and increase the heat thereof: Contrarily, *Sleep* setteth and retraineth the motion and gadding of the same. For though *Sleep* doth strengthen and advance the Actions of the parts, and of the liveliest Spirits; and all that motion, which is to the Circumference of the body; yet it doth in great part, quiet and still the proper motion of the *Living Spirit*. Now sleep regularly, is due unto humane Nature, once within four and twenty hours; and that for six, or five hours at the least: Though there are, even in this kind, sometimes Miracles of Nature; As it is recorded of *Mecanas*, that he slept, not for a long time before his death. And as touching the want of Refrigeration, for conserving of the Spirit, thus much.

As concerning the third Indigence; namely of *Aliment*: It seems to pertain rather to the *Parts* than to the *living Spirit*. For a man may easily believe, that the *living Spirit* subsisteth in Identity; not by succession or renovation. And as for the *Reasonable Soul* in man, it is above all question, that it is not engendered of the Soul of the parents, nor is repaired, nor canie. They speak of the *Natural Spirit* of living creatures; and also of *Vegetables*, which distill from that other Soul essentially and formally. For out of the confusion of these, that same transmigration of Souls, and innumerable other devices of *Heathens* and *Hereticks*, have proceeded.

The body of man doth regularly require *Renovation*, every day. And a body in health can scarce endure fasting three dayes together; notwithstanding use and custom will doe much even in this case, but in sickness fasting is lesse grievous to the body. Also *Sleep* doth supply somewhat to nourishment; And on the other side *Exercise* doth require it more abundantly. Likewise there have some been found, who sustained themselves, (almost to a miracle in Nature,) a very long time, without meat or drink.

Dead Bodies, if they be not intercepted by *putrefaction*, will subsist a long time, without any notable *Absumption*; But *living bodies* not above three dayes (as we said) unless they be repaired by nourishment, which sheweth, that quick *Absumption* to be the work of the *living Spirit*; which either repairs it self, or puts the *Parts* into a necessity of being repaired, or both. This is testified by that also which was noted a little before; namely, that *living creatures* may subsist somewhat the longer, without *Aliment*, if they sleep. Now sleep is nothing else but a reception and retirement of the *living Spirit* into it self.

An abundant and continual *Effluxion* of blood, which sometimes happeneth in the *Hemorrhoides*; sometimes in vomiting of blood, the inward *Veines* being unlocked, or broken, sometimes by wounds, cometh suddain death; in regard, that the blood of the *Veins* ministrerth to the *Arteries*; and the blood of the *Arteries* to the *Spirit*.

26

The quantity of meat and drink, which a man, eating to meals a day, receiveth into his body, is not small; much more than he voideth again either by stool or by urine, or by sweating. You will say, No marvel, seeing the remainder goeth into the Juices and Substance of the body: It is true; but consider then, that this addition is made twice a day, and yet the body aboundeth much. In like manner, though the Spirit be repaired, yet is growes not excellively in the quantity.

27

It doth no good to have the Aliment ready, in a degree removed; but to have it of that kind; and so prepared and supplied, that the Spirit may work upon it; For the Staffe of a Torch alone will not maintain the flame, unlesse it be fed with wax: Neither can men live upon Herbs alone. And from thence comes the *Inconcoction* of old Age, that though there be flesh and blood, yet the Spirit is become so penurious and thin, and the Juices and blood so heartlelie and obstinate, that they hold no proportion to *Alimentation*.

28

Let us now cast up the *Accounts* of the *Needs* and *Indigences*, according to the ordinary and usual course of Nature: The Spirit hath need of opening and moving it self in the *Ventricles* of the brain and nerves even continually; Of the motion of the *Heart* every third part of a moment; of breathing every moment; of sleep and nourishment once within three dayes; of the power of nourishment commonly till eighty years be past. And if any of these *Indigences* be neglected, *Death* ensueth. So there are plainly three *Porches* of *Death*; *Destitution* of the Spirit; *In the Motion*, in the *Refrigeration*, in the *Aliment*.

It is an error to think, that the Living Spirit is perpetually generated and Extinguished, as Flame is; and abideth not any notable time. For even Flame it self is not thus, out of his own proper Nature; But because it liveth amongst enemies. For Flame within Flame endureth. Now the Living Spirit liveth amongst Friends, and all due Obsequiousnesse: So then, as Flame is a momentary Substance, Air is a fixed Substance, the Living Spirit is betwixt both.

Touching the Extinguishing of the Spirit by the Destruction of the Organs, (which is caused by Diseases and Violence,) we enquire not now, as we foretold in the beginning; Although that also endeth in the same three Porches. And touching the Form of Death it self, thus much.

29

There are two great *Fore-runners* of *Death*, the one sent from the *Head*, the other from the *Heart*; *Convulsion* and the extreme labour of the *Pulse*. For as for the deadly *Hiccough*, it is a kind of *Convulsion*. But the deadly labour of the *Pulse* hath that unusua: swiftnesse; because the *Heart* at the point of *Death*, doth so tremble, that the *Systole*, and *Diastole* thereof, are almost confounded. There is also conjoynd in the *Pulse*, a weaknesse and lownesse, and oftentimes a great *Intermission*; because the motion of the heart faileth, and is not able to rise against the assault stoutly, or constantly.

30

The immediate preceding signs of *Death* are, great unquietnesse, and tossing in the bed fumbling with the hands, catching and grasping hard, gnashing with the Teeth, speaking hollow, trembling of the neather lip, palenesse of the face, the memory confused, speechlesnesse, cold sweats, the body shooting in length, lifting up the white of the eye changing of the whole visage, (as the Nose sharp, eyes hollow, cheeks fallen) contraction and doubling of the coldnesse in the *Extream parts* of the body; in some, shedding of blood, or sperm, shrieking, breathing thick and short, falling of the neather chap, and such like.

31

There follow *Death*, a privation of all sense and motion, as well of the *Heart* and *Arteries*, as of the *Nerves* and *Joynts*; and inability of the body to support it self upright, stiffness of the *Nerves* and *Parts*, extream coldnesse of the whole body; after a little while, putrefaction and sinking.

32

Eles, *Serpents*, and the *Insecta*, will move a long time after they are cut asunder; insomuch that *Country* people think, that the parts strive to joyn together again. Also *Birds* will flutter a great while after their heads are pulled off: And the *Hearts* of living *Creatures* will pant a long time after they are plucked out. I remember I have seen the heart of one that was bowelled, as suffering for high *Treason*, that being cast into the fire, leaped at the first, at least a foot and half in height; and after by degrees lower and lower, for the space, as we remember, of seven or eight minutes. There is also an ancient and credible tradition, of an *Ox* Lowing after his bowels were plucked out. But there is a more certain tradition of a *Man*, who being under the

Executioners hand for high Treason; after his *Heart* was plucked out, and in the Executioners hand, was heard to utter three or four words of prayer: which therefore we said to be more credible than that of the *Ox* in *Sacrifice*; because the friends of the party suffering, do usually give a reward to the Executioner, to dispatch his Office with the more speed, that they may the sooner be rid of their pain; but in *Sacrifices*, we see no cause why the Priest should be so speedy in his Office.

For *Revising* those again which fall into sudden *Swearing*, and *Catalepses*, of *Asphensiments*: (in which *Fits*, many, without present help, would utterly expire;) These things are used; Putting into their Mouths water distilled of Wine, which they call *Hot Waters*, and *Cordial waters*; bending the body forwards, stopping the Mouth and Nostrils hard, bending or wringing the fingers, pulling the hairs of the beard, or head; rubbing of the parts, especially the Face and Legs; sudden casting of cold water upon the Face, shrieking out aloud, and suddenly; putting *Rose-water* to the Nostrils, with *Vinegar* in faintings; burning of Feathers, or Cloath, in the suffocation of the *Mother*, but especially a *Frying-span* heated red hot, is good in *Apoplexies*: Also a close embracing of the body, hath helped some.

There have been many examples of men in shew dead; either laid out upon the cold floor; or carried forth to burial; Nay, of some buried in the earth, which notwithstanding have lived again; which hath been found in those that were buried, (the earth being afterwards opened,) by the bruising and wounding of their head, through the strugling of the body within the Coffin: Whereof the most Recent and Memorable example, was that of *Joannes Scotus*, called the *Subtile*, and a *Schoolman*, who being digged up again by his Servant, unfortunately absent at his burial; (and who knew his Masters manner in such Fits,) was found in that state. And the like happened in our daies, in the person of a Player, buried at *Cambridge*. I remember to have heard of a certain *Gentleman*, that would needs make tryal in curiosity, what men did feel that were hanged; So he fastned the Cord about his Neck, raising himself upon a stool, and then letting himself fall; thinking it should be in his power to recover the stool at his pleasure, which he failed in; but was helped by a friend then present. He was asked afterward what he felt? He said, He felt no pain; but first, he thought he saw before his eyes a great Fire, and burning: Then he thought he saw all Black, and Dark: Lastly, it turned to a pale blew, or Sea-water Green: which colour is also often seen by them which fall into *Swoonings*. I have heard also of a Physician, yet living, who recovered a man to life which had hanged himself; and had hanged half an hour, by *Erications*, and hot *Baths*: And the same Physician did profess, that he made no doubt to recover any man, that had hanged so long, so his Neck were not broken with the first Swing.



The Differences of Youth and old Age.



The Ladder of Mans Body is this, To be conceived, to be quickned in the Womb, to be born, to suck, to be weaned, to feed upon Pap. to put forth Teeth, the first time about the second year of Age, to begin to go, to begin to speak, to put forth teeth the second time, about seven years of Age, to come to *Puberty* about twelve or fourteen years of age, to be able for generation, and the flowing of the *Menstrue*, to have hairs about the Legs and Arm-holes, to put forth a Beard; And thus long, and sometimes later, to grow in stature, to come to full years of strength and agility, to grow gray and bald; The ceasing of the *Menstrua*, and ability to generation, to grow decrepit, and a Monster with three Legs, to die. Mean while the mind also hath certain periods; but they cannot by described by years, as to decay in the *Memory*, and the like; of which hereafter.

The differences of *Youth* and *Old Age*, are these. A young mans skin is smooth, and plain; an old mans dry, and wrinkled; especially about the forehead and eyes: A young mans flesh is tender and soft, an old mans hard: A young man hath strength and agility, an old man feels decay in his strength, and is slow of motion: A young man

33

34

To the 16
Article.

1

2

hath good digestion, an old man bad : A young mans bowels are soft and succulent, an old mans salt and parched: A young mans body is erect and streight, an old mans bowing and crooked : A young mans limbs are steady, an old mans weak and trembling : the humours in a young man are cholerick, and his blood inclined to heat ; in an old man plegmatick and melancholick, and his blood inclined to coldness : A young man ready for the act of *Venus*, an old man slow unto it : in a young man the juices of his body are more Roside, in an old man more crude and warriſt: the Spirit in a young man plentiful and boyling, in an old man scarce and jejune : A young mans spirit is dense and vigorous, an old mans eager and rare : A young man hath his senses quick and entire, an old man dull and decayed : A young mans Teeth are strong and entire, an old mans weak, worn, and falling out : A young mans hair is coloured, an old mans of what colour soever it were, gray : A young man hath hair, an old man baldness : A young mans pulie is stronger and quicker, an old mans more confused and slower : The diseases of young men are more acute and curable, of old men longer and hard to cure : A young mans wounds soon close, an old mans later : A young mans cheeks are of a fresh colour, an old mans pale, or with a black blood : A young man is lesse troubled with Rhumes, an old man more: Neither do we know in what things old men do improve, as touching their body, save only sometime in fatness; whereof the Reason is soon given : Because old mens bodies do neither peripire well, nor assimilate well. Now Fatnesse is nothing else, but an exuberance of nourishment, above that which is voided by excrement; or which is perfectly assimilated. Also, some old men improve in the appetite of feeding, by reason of the *Acide humours*; though old men digest worst. And all these things which we have said, *Physicians* negligently enough will refer to the *Diminution* of the *Natural heat*, and *Radical Moisture*; Which are things of no worth for use. This is certain, *Drinesse* in the coming on of years, doth forego *Coldnesse*; and bodies when they come to the top, and strength of heat, do decline in *Drinesse*; and after that follows *Coldness*.

3

Now we are to consider the *Affections* of the *Mind*, I remember when I was a young man at *Poitiers* in *France*, I conversed familiarly with a certain *Frenchman*; a witty young man, but something talkative; who afterwards grew to be a very eminent man: he was wont to inveigh against the manners of *Old men*, and would say, That if their Minds could be seen, as their Bodies are, they would appear no less deformed. Besides, being in love with his own wit, he would maintain, That the vices of old Mens minds, have some correspondence, and were parallel to the putrefactions of their bodies : For the drinesse of their skin, he would bring in *Impudence*; for the hardness of their bowels, *Vnumercifulness*; For the *Lippitude* of their eyes, an *evill Eye*, and *Envy*; For the casting down of their eyes, and bowing their body towards the earth, *Atheism*; (for, saith he, they look no more up to Heaven, as they were wont;) For the trembling of their Members, *Irresolution* of their *Decrees*, and *light inconstancy*; For the bending of their fingers, as it were to catch, *Rapacity* and *Covetousnesse*; For the buckling of their knees, *fearfulness*; For their wrinkles, *Craftinesse* and *Obliquity*: And other things which I have forgotten. But to be serious, a young man is modest and shamefast, an old mans forehead is hardened : A young man is full of bounty and mercy, an old mans heart is brawny : A young man is affected with a laudible Emulation, an old man with a malignant envy : A young man is inclined to Religion, and Devotion, by reason of his fervency and inexperience of evill; An old man cooleth in piety, through the coldnesse of his Charity, and long conversation in evill; and likewise, through the difficulty of his belief : A young mans desires are vehement, an old mans moderate : A young man is light and moveable, an old man more grave and constant : A young man is given to liberality and beneficence, and humanity; an old man to covetousness, wisdom for his own self, and seeking his own ends : A young man is confident, and full of hope; An old man diffident, and given to suspect most things : A young man is gentle and obsequious, an old man froward and disdainfull : A young man is sincere and open hearted, an old man cautelous and close : A young man is given to desire great things, an old man to regard things necessary : A young man thinks well of the present times, an old man preferreth times past before them : A young man reverenceth his superiours, an old man is more forward to tax them. And many other things, which pertain rather to manners, than to the present inquisition. Notwithstanding old men, as in some things they improve in their bodies, so also in their minds, unlesse they be altogether out of date. Namely ; that as they are lesse apt for invention,

tion, so they excell in judgement, and prefer safe Things, and sound things before specious; Also they improve in Garrulity and Ostentation; For they seek the Fruit of Speech, while they are less able for Action, So as it was not absurd, that the *Poets* said old *Tirbon*, to be turned into a *Grashopper*.



Moveable Canons of the Duration of Life, and Form of Death,

Canon. I.

Consumption is not caused, unless that, which be departed with by one Body, passeth into another.

The Explication.

There is in Nature no *Annihilating*, or *Reducing to Nothing*: Therefore that which is consumed, is either resolved into Air, or turned into some Body adjacent, So we see a *Spider*, or *Fly*, or *Ant*, in Amber, Entombed in a more stately Monument than Kings are, to be laid up for Eternity; Although they be but tender things, and soon dissipated. But the matter is this, that there is no Air by, into which they should be resolved; And the *Substance* of the *Amber* is so *Heterogeneous*, that it receives nothing of them. The like we conceive would be, if a *Stick* or *Roar*, or some such thing were Buried in *Quick-silver*, Also *Wax*, and *Honey*, and *Gums* have the same *Operation*, but in part only.

Canon II.

There is in every Tangible body a Spirit, covered and encompassed with the Grosser Parts of the Body; And from it all Consumption and Dissolution, hath the Beginning.

The Explication.

NO Body known unto us here in the upper part of the Earth is without a Spirit, Either by *Attenuation*, and *Concoction* from the heat of the Heavenly Bodies. Or by some other way. For the *Concavities* of *Tangible Things*, receive not *Vacuum*; But either Air, or the proper *Spirit* of the Thing. And this *Spirit* whereof we speak, is not some *Verme*, or *Energie* or *Act*, or a *Trist*; But plainly a Body, rare and invisible; Notwithstanding circumscribed by place, Quantitative, Real: Neither again, is that Spirit, Air, (no more than Wine is Water) But a Body rarified, of kin to Air, though much different from it. Now the Grosser parts of Bodies (being dull things, and not apt for Motion) would last a long time; But the Spirit is that which troubleth and plucketh, and undermineth them, and converteth the Moisture of the Body, and whatsoever it is able to digest, into new Spirit; And then as well the *Pre-existing* Spirit of the Body, as that newly made, fly away together by degrees. This is best seen by the *Diminution* of the *Weight* in bodies dried, through *Perspiration*. For neither, all that which is issued forth was spirit, when the body was ponderous; neither was it not spirit, when it issued forth.

Canon III.

The Spirit issuing forth, dryeth; Detained and working within, either Melteeth, or Putrifieeth, or Vivifieth.

The Explication.

There are four Processes of the Spirit; To *Arefaction*; To *Colliquation*; To *Putrefaction*; To *Generation* of bodies. *Arefaction* is not the proper Work of the Spirit, but of the Grosser parts, after the Spirit issued forth: For then they contract themselves partly by their flight of *Vacuum*, partly by the *Union* of the *Homogeneous*; As appears in all things which are Arified by Age: And in the dryer sort of bodies, which have passed the Fire; As *Bricks*, *Charcoals*, *Bread*. *Colliquation* is the meer work of the Spirit: Neither is it done but when they are excited by heat: For then, the Spirits dilating themselves, yet not Getting forth, do insinuate, and disperse themselves amongst the Grosser parts; And so make them soft, and apt to run, as it is in *Metals*, and *Wax*: For *Metals*, and all Tenacious things, are apt to inhibit the Spirit, that being

excited, it issueth not forth. *Putrefaction* is a mixed work of the *Spirits*, and of the *Grosser* parts: For the Spirit (which before restrained and bridled the parts of the thing) being partly issued forth, and partly enfeebled; All things in the body do dissolve and return to their *Homogeneties*, or (if you will) to their *Elements*: That which was spirit in it, is congregated to it self, whereby things *Putrified* begin to have an ill savour: The *Oily* parts to themselves, whereby things *putrified* have that *Slipperinesse* and *Unctuousity*: The *watry* parts also to themselves: The *Dregs* to themselves; Whence followeth that *Confusion* in *Bodies Putrified*. But *Generation*, or *Vivification* is a Work also mixed of the Spirit and *Grosser* parts, but in a far different manner: For the Spirit is totally detained, but it swelleth and moveth locally; And the *Grosser* parts are not dissolved, but follow the motion of the Spirit, and are, as it were, blown out by it; and extruded into divers figures; From whence cometh that *Generation*, and *Organization*; And therefore *Vivification* is alwaies done in a *Matter Tenacious*, and *Clammy*; And again, *Yeelding* and *Soft*, that there may be both a *Detention* of the Spirit, and also a *gentle Cession* of the parts: according as the spirit forms them. And this is seen in the *Matter*, as well of all *Vegetables*, as of *Living Creatures*; whether they be engendred of *Putrefaction*, or of *Sperm*: For in all these things there is manifestly seen a matter, hard to break thorow, easie to yeeld.

Canon IV.

IN all living Creatures there are two kinds of Spirits, livelesse Spirits, such as are in *bodies Inanimate*; And a *Vital Spirit Superadded*.

The Explication.

IT was said before, that to procure Long Life, the Body of Man must be considered; First, as *Inanimate*, and not Repaired by Nourishment. Secondly, as *Animate*, and Repaired by Nourishment: For the former Consideration gives Laws touching *Consumption*; The latter, touching *Reparation*. Therefore we must know, that there are in *Humane Flesh*, *Bones*, *Membranes*, *Organs*; Finally in all the parts, such spirits diffused in the substance of them, while they are alive, as there are in the same things (Flesh, Bones, Membranes, and the rest) Separated and Dead; Such as also remain in a *Carkise*: But the *Vital Spirit*, although it ruleth them, and hath some consent with them, yet it is far differing from them; Being integral, and subsisting by it self. Now there are two especial Differences betwixt the *Livelesse Spirits*, and the *Vital Spirits*: The one that the *Livelesse Spirits* are not continued to themselves, but are, as it were, cut off, and encompassed with a *Grosse body*, which intercepts them; As *Air* is mixt with *Snow*, or *Froth*: But the *Vital Spirit* is all continued to it self, by certain *Conduit Pipes*, thorow which it passeth, and is not totally intercepted. And this Spirit is twofold also: The one branched, only passing through small pipes, and, as it were, strings: The other hath a *Cell* also; so as it is not only continued to it self, but also congregated in an hollow space, in reasonable good Quantity, according to the *Analogy* of the *Body*: And in that *Cell* is the *Fountain* of the *Rivulets*, which branch from thence. That *Cell* is chiefly in the *Ventricles* of the *Brain*, which in the *Ignobler* sort of *Creatures* are but narrow; Infomuch that the *Spirits* in them seem scattered over their whole body, rather than *Celled*: As may be seen in *Serpents*, *Eeles*, and *Flyes*, whereof every of their parts move long after they are cut asunder. *Birds* also leap a good while after their heads are pulled off, because they have little *Heads*, and little *Cells*: But the *Nobler* sort of *Creatures* have those *Ventricles* larger: And Man the largest of all. The other difference betwixt the *Spirits*, is, That the *Vital spirit* hath a kind of *enkindling* and is like a *Wind* or *Breath* compounded of *Flame* and *Aire*, as the *Juyces* of *Living Creatures* have both *Oyl* and *Water*. And this *enkindling* ministrerth peculiar *Motions* and *Faculties*: For the *smoke* which is *inflammable*, even before the *Flame* conceived, is *Hot*, *Thin*, and *Movaeable*, and yet it is quite another thing, after it is become *Flame*: But the *enkindling* of the *Vital spirits* is by many *Degrees* gentler than the softest *Flame*: As of *Spirit of Wine*, or other wise: And besides it is in great part mixed with an *Aerial substance*: That it should be a *Mystery* or *Miracle*, both of a *Flammous*, and *Aerous* Nature.

Canon V.

THese Natural Actions are proper to the several Parts; But it is the *Vital Spirit* that excites and sharpens them.

The Explication.

THe *Actions* or *Functions*, which are in the several *Members*, follow the Nature of the *Members* themselves; (*Attraction*, *Retention*, *Digestion*, *Assimilation*, *Separation*, *Excretion*, *Perpiration*, even *Sen e* it self;) According to the Propriety of the several *Organs*, (the *Stomach*, *Liver*, *Heart*, *Spleen*, *Gall*, *Brain*, *Eye*, *Ear*, and the rest.) Yet none of these *Actions* would ever have been actuated, but by the *Vigour* and *Presence* of the *Vital Spirit*, and *Heat* thereof: As one *Iron* would not have drawn another *Iron*, unless it had been excited by the *Load-Stone*; Nor an *Eggs* would ever have brought forth a *Bird*, unless the *Substance* of the *Hen* had been actuated by the *Treading* of the *Cock*.

Canon VI.

THe *Livelesse Spirits* are next *Consubstantial* to *Air*; *The Vital Spirits*, approach more to the *Substance* of *Flame*.

The Explication.

THe *Explication* of the precedent fourth *Canon*, is also a declaration of this present *Canon*: But yet further, from hence it is that all *Fat* and *Oily Things*, continue long in their *Being*; For neither doth the *Air* much pluck them; Neither do they much desire to joyn themselves with *Air*. As for that conceit, it is altogether vain; That *Flame* should be *Air* set on *Fire*; Seeing *Flame* and *Air* are no lesse *Heterogeneous* than *Oyl* and *Water*. But whereas it is said in the *Canon*, That the *Vital Spirits* approach more to the *Substance* of *Flame*; It must be understood, that they do this more than the *Livelesse Spirits*; Not that they are more *Flamy* than *Air*.

Canon VII.

THe *Spirit* hath two *Desires*: *One* of *Multiplying it self*, the other of *Flying forth*, and *Congregating it self* with the *Connaturals*.

The Explication.

THe *Canon* is understood of the *Livelesse Spirits*: For as for the *second Desire*, the *Vital Spirit*, doth most of all abhor *lying forth* of the body; For it finds no *Connaturals* here below to joyn withall. Perhaps it may sometimes flye to the outward parts of the *Body*, to meet that which it loveth; But the *lying forth*, as I said, it abhorreth. But in the *Livelesse Spirits*, each of these two *Desires* holdeth. For to the former this belongeth; *Every Spirit* seated amongst the *Grosser Parts* dwelleth unhappily: And therefore when it finds not a *like* unto it self, it doth so much the more labour to create, and make a *like*: As being in a great *Solitude*, and endeavour earnestly to multiply it self, and to prey upon the *Volatile* of the *Grosser Parts*, that it may be increased in *Quantity*. As for the *Second Desire* of *Flying forth*, and betaking it self to the *Air*; It is certain that all *Light Things* (which are ever *Moveable*) do willingly go unto their *Likes* near unto them: As a *Drop* of water is carried to a *Drop*; *Flame* to *Flame*: But much more this is done in the *lying forth* of *Spirit* into the *Air* Ambient; because it is not carried to a *Particle* like unto it self, but also as unto the *Globe* of the *Connaturals*. Mean while this is to be noted, that the *Going forth*, and *Flight* of the *Spirit* into *Air*, is a redoubled *Action*: Partly out of the *Appetite* of the *Spirit*, partly out of the *Appetite* of the *Air*: For the *Common Air* is a needy Thing and receiveth all things speedily, as *Spirits*, *Odours*, *Beams*, *Sounds*, and the like.

Canon VIII.

Spirit Detained, if it have no possibility of begetting new *Spirits*, intenerateth the *Grosser Parts*.

The Explication.

Generation of new *Spirit* is not accomplished, but upon those things which are, in some Degree near to *Spirit*: Such as are *Humid Bodies*. And therefore if the *Grosser parts* (amongst which the *Spirit* converseth) be in a remote Degree, although the *Spirit* cannot convert them, yet (as much as it can) it weakneth, and softneth, and subdueth them, that seeing it cannot increase in *Quantity*, yet it will dwell more at large, and live amongst good *Neighbours* and *Friends*. Now this *Aphorism* is most usefull to our End; because it tendeth to the *Inteneration* of the *Obstinate Parts*, by the detention of the *Spirit*.

Canon IX.

THe *Inteneration* of the *Harder Parts* commeth to good effect, when the *Spirit* neither flyeth forth, nor begetteth new *Spirit*.

The Explication.

THis Canon solveth the Knot and Difficulty in the Operation of Intenerating by the Detention of the *Spirits*. For if the Spirit not flying forth, wasteth all within, there is nothing gotten, to the *Inteneration* of the parts in their Subsistence; But rather they are dissolved, and corrupted. Therefore together with the *Detention*, the *Spirits* ought to be cooled, and restrained, that they may not be too Active.

Canon X.

THe Heat of the Spirit to keep, the Body Fresh and Green, ought to be Robust, not Eager.

The Explication.

Also this Canon pertaineth to the solving of the knot aforesaid; But it is of a much larger Extent. For it setteth down, of what *Temperament* the Heat in the Body ought to be for the obtaining of Long Life: Now this is usefull, whether the *Spirits* be detained, or whether they be not. For howsoever, the Heat of the *Spirits* must be such, as it may rather turn it self upon the Hard parts, than waste the Soft; For the one Desiccateth, the other Intenerateth. Besides, the same Thing is available to the well perfecting of *Assimilation*; For such an Heat doth excellently excite the Faculty of *Assimilation*; And withall doth excellently prepare the Matter to be *Assimilated*. Now the Properties of this kind of Heat ought to be these. First, that it be Slow, and heat not suddenly: Secondly, that it be not very Intense, but Moderate; Thirdly, that it be Equal, not Incomposed; Namely, Intending and remitting it self: Fourthly, that if this Heat meet any thing to resist it, it be not easily suffocated or languish. This *Operation* is exceeding subtile, but seeing it is one of the most usefull, it is not to be deserted. Now in those Remedies (which we propounded to invest the *Spirits* with a Robust Heat; Or, that which we call *Operative*, not *Predatory*) we have in some sort satisfied this Matter.

Canon XI.

THe Codensing of the *Spirits*, in their Substance, is available to long Life.

The Explication.

THis Canon is subordinate to the next prececent: For the *Spirit condensed*, receiveth all those four properties of Heat, whereof we spake: but the ways of *Condensing* them are set down in the first of the Ten *Operations*.

Canon XII.

THe Spirit in great Quantity, bisseth more to Flying forth, and preyeth upon the Body more than in small Quantity.

The Explication.

THis Canon is clear of it self, seeing meer Quantity, doth regularly increase Vertue. And it is to be seen in Flames, that the bigger they are, the stronger they break forth, and the more speedily they consume. And therefore over great *Plenty*, or *Exuberance* of the *Spirits* is altogether hurtfull to Long Life: Neither need one with a greater store of *Spirits* than what is sufficient for the Function of Life, and the Office of a good Reparation.

Canon XIII.

THe Spirit equally dispersed, maketh lesse haste to flye forth, and preyeth lesse upon the Body, than unequally placed.

The Explication.

Not only abundance of *Spirits* in respect of the whole, is hurtfull to the Duration of Things, but also the same Abundance unevenly placed, is in like manner hurtfull: And therefore the more the Spirit is shred, and inserted by small portions, the less it preyeth: For dissolution ever beginneth at that part, where the Spirit is looser. And therefore both exercise and Frictions conduce much to Long life: For Agitation doth finest diffuse and commix things by small Portions.

Canon XIV.

THe Inordinate and Subsaltory Motion of the *Spirits* doth more hasten to Going forth, and doth prey upon the Body more than the Constant and Equal.

The Explication.

IN *Inanimates*, this Canon holds for certain; For Inequality is the Mother of Dissolution; But in *Animates* (because not only the Consumption is considered, but the Repara-

Reparation; and reparation proceedeth by the Appetites of things; And Appetite is sharpened by variety,) It holdeth not rigorously; but it is so far forth to be received, that this variety be rather an alternation, or enterchange, than a confusion, and as it were constant in inconstancy.

Canon XV.

The Spirit in a Body of a Solid Composure, is detained though unwillingly.

The Explication.

ALL things do abhor a solution of their Continuity, but yet in proportion to their Density, or Rarity: For the more Rare the Bodies be, the more do they suffer themselves to be thrust into small and narrow passages; for water will go into a passage which dust will not go into; and Air, which water will not go into: Nay, Flame and Spirit, which Air will not go into. Notwithstanding of this thing, there are some bounds: For the Spirit is not so much transported with the desire of going forth, that it will suffer it self to be too much discontinued, or be driven into over-straight pores and passages: and therefore if the Spirit be encompassed with an hard body, or else with an *Viscuous* and *Tenacious* (which is not easily divided) it is plainly bound; and, as I may say, imprisoned, and layeth down the appetite of going out: Wherefore we see, that *Metals* and *Stones* require a long time for their Spirit to go forth; unless either the Spirit be excited by the fire, or the grosser parts be dissolved with corroding and strong waters. The like Reason is there of *Tenacious bodies*; such as are *Gums*, save only that they are melted by a more gentle heat. And therefore the *juices* of the body hard, a close and compact skin, and the like, (which are procured by the *Drieness* of the *Aliment*, and by *exercise*, and by the *coldness* of the *air*;) are good for long life; because they detain the Spirit in close prison, that it goeth not forth.

Canon XVI.

IN Oily and Fat things, the Spirit is detained willingly, though they be not Tenacious.

The Explication.

THE Spirit, if it be not irritated by the *Antipathy* of the body enclosing it; nor fed by the over-much *likenesse* of that body; nor solicited nor invited by the *external body*, it makes no great stir to get out: All which are wanting to *Oily bodies*: for they are neither so pressing upon the Spirits as *hard bodies*, nor so near as *watry bodies*; neither have they any good agreement with the *air ambient*.

Canon XVII.

THE Speedy Flying forth of the Watry Humour, conserves the Oily the longer in his Being.

The Explication.

WE said before, that the *Watry Humours*, as being *Consubstantial* to the *Air*, flye forth soonest; the *Oily* later, as having small agreement with the *Air*. Now whereas these two *Humours* are in most bodies, it comes to passe, that the *Watry* doth, in a sort, betray the *Oily*; for that issuing forth insensibly, carryeth this together with it. Therefore there is nothing more furthereth the Conservation of Bodies than a *gentle Drying* of them; which causeth the *Watry Humour* to expire, and inviteth not the *Oily*: For then the *Oily* enjoyeth the proper Nature. And this tendeth not only to the Inhibiting of *Putrefaction*, (though that also followeth,) but to the conservation of *Greenesse*. Hence it is, that *gentle Frictions*, and *moderate exercises*, causing rather *Perspiration* than *Sweating*, conduce much to long life.

Canon XVIII.

Air excluded, conferreth to Long Life, if other Inconveniences be avoided.

The Explication.

WE said a little before, That the *Flying forth* of the *Spirit*, is a redoubled Action, from the *Appetite* of the *Spirit*, and of the *Air*. And therefore if either of these be taken out of the way, there is not a little gained. Notwithstanding divers *Inconveniences* follow hereupon; which how they may be prevented, we have shewed in the second of our *Operations*.

Canon XIX.

Youthfull Spirits inserted into an Old Body, might soon turn Natures Course back again.

The Explication.

THe Nature of the Spirits is as the uppermost *Wheel*, which turneth about the other *wheels* in the body of man. And therefore in the *Intention* of long life, that ought to be first placed. Hereunto may be added, That there is an easier and more expedite way to alter the *Spirits*, than to other *Operations*. For the *Operation* upon the *Spirits* is two-fold, The one by *Aliments*, which is slow, and as it were, about; The other, (and that two-fold) which is sudden, and goeth directly to the *Spirits*; namely, by *Vapours*, or by the *Affections*.

Canon XX.

Juyces of the Body, Hard and Roscid, are good for long Life.

The Explication.

THe Reason is plain, seeing we shewed before; That *hard things*, and *Oily* or *Roscid*, are hardly dissipated. Notwithstanding there is difference, (as we also noted in the tenth *Operation*) That *Juice* somewhat hard, is indeed lesse *Dissipable*, but then it is withall lesse *Reparable*. Therefore a *Convenience* is interlaced with an *Inconvenience*; And for this cause no wonderfull matter will be atchieved by this. But *Roscid Juice* will admit both *Operations*. Therefore this would be principally endeavoured:

Canon XXI.

Vhatsoever is of Thin Parts, to penetrate; And yet hath no Acrimony to bite, begetteth Roscid Juices.

The Explication.

THis Canon is more hard to practise than to understand; For it is manifest, Whatsoever penetrateth well, but yet with a *Sting*, or *tooth*; (as do all sharp and sour things,) it leaveth behind it, wheresoever it goeth, some mark, or print, of *Drynesse*, and *Cleaving*; so that it hardneth the *Juices*, and chappeth the *Parts*: Contrarily, whatsoever things penetrate through their *thinnesse* meerly, as it were by stealth, and by way of *Insinuation*, without violence; they *bedew*, and *water* in their passage: Of which fort we have recounted many in the fourth and seventh *Operations*.

Canon XXII.

Affimilation is best done when all Local Motion is expended.

The Explication.

THis Canon we have sufficiently explained in our Discourse upon the eighth *Operation*.

Canon XXIII.

Alimentation from without, at least some other Way than by the Stomach, is most profitable for long life, if it can be done.

The Explication.

VVE see that all things which are done by *Nutrition*, ask a long time; but those which are done by *Embracing* of the *like*, (as it is in *Infusions*.) require no long time. And therefore *Alimentation from without*, would be of principle use; and so much the more, because the *Faculties* of *Concoction* decay in old age; So that if there could be some auxiliary *Nutritions*, by *bashings*, *unctions*, or else by *Clysters*: These things in conjunction might do much, which single are lesse available.

Canon XXIV

VHere the *Concoction* is weak to thrust forth the *Aliment*; there the *Outward Parts* should be strengthened, to call forth the *Aliment*.

The Explication.

That which is propounded in this Canon, is not the same thing with the former; for it is one thing for the *Outward Aliment* to be attracted inward; another for the *Inward Aliment* to be attracted outward: yet herein they concur, that they both help the weakness of the *Inward Concoctions*, though by divers wayes.

Canon XXV.

All sudden Renovation of the Body is wrought either by the Spirit, or by Malaciffations.

The Explication.

THere are two things in the body; *Spirits* and *Parts*: To both these the way by *Nutrition*, is long and about; but it is a short way to the *Spirits* by *Vapours*, and by the *Affections*; and to the *Parts* by *Malaciffations*: But this is diligently to be noted; that by no means we confound *Alimentation from without*, with *Malaciffations*: for the *Intention* of *Malaciffation*, is not to nourish the parts, but only to make them more fit to be nourished.

Canon XXVI.

Malaciffation is wrought by *Consubstantialis*, by *Imprinters*, and by *Clofers* up.

The Explication.

THe Reason is manifest; for that *Consubstantialis* do properly supple the body, *Imprinters* doe carry in, *Clofers* up do retain and bridle the *Perpiration*, which is a motion opposite to *Malaciffation*. And therefore (as we described in the ninth *Opiration*.) *Malaciffation* cannot well be done at once; but in a course or order. First by excluding the liquor by *Thickners*; for an owtward and grosse Infusion doth not well compact the body; that which enreth must be subtiler, and a kind of vapour. Secondly, by *Intenerating* by the consent of *Consubstantialis*: For bodies upon the touch of those things which have good agreement with them, open themselves, and relax their pores. Thirdly, *Imprinters* are *Convoyes*, and insinuate into the parts, the *Consubstantialis*. And the mixt use of gentle *Astringents* doth somewhat restrain the *Perpiration*. But then, in the fourth place, follows that great *Astriction*, and *Closure* up of the body, by *Emplastration*, and then afterward by *Inunction*, unill the *Supple* be turned into *Solid*, as we said in the proper place.

Canon XXVII.

Frequent Renovation of the Parts *Reparable*, watereth and reneweth the *lesse* *Reparable* also.

The Explication.

VVe said in the Preface to this History, That the way of Death was this; That the *Parts Reparable* died in the fellowship of the *Parts lesse Reparable*; So that in the *Reparation* of these same *less Reparable Parts*, all our forces would be employed. And therefore, being admonished by *Aristoles* observation touching *Plants*; namely, That the putting forth of new *shoots* and *branches*, fresheth the body of the tree in the passage; We conceive the like reason might be, if the *Flesh* and *Blood* in the body of Man, were often renewed; that therby the *Bones* themselves, and *Membranes*, and other parts, which in their own nature are *lesse Reparable*; partly by the cheerfull passage of the *Juices* partly by that new cloathing of the young *Flesh* and *Blood*, might be *wared* and *renewed*.

Canon XXVIII.

Refrigeration, or Cooling of the Body, which passeth some other wayes than by the *Stomach*, is usefull for long life.

The Explication.

THe Reason is at hand; for seeing a *Refrigeration* not temperate, but powerfull, (especially of the *Blood*;) is above all things necessary to long life; This can by no means be effected from within, as much as is requisite, without the destruction of the *Stomach* and *Bowels*.

Canon XXIX.

That *Intermixing*, or *Entangling*, that as well *Consumption*, as *Reparation*, are the *workes* of heat, is the greatest obstacle to long life.

The Explication.

Almost all great works are destroyed by the *Natures* of things *Intermixed*, when as that which helpeth in one respect, hurtech in another: Therefore men must proceed herein by a sound judgement, and a discreet practice: For our parr, we have done so, as far as the matter will bear, and our memory serveth us, by separating *benign* *beats* from *hurtfull*; and the *Remedies* which tend to both.

Canon XXX.

Curing of Diseases is effected by *Temporary Medicines*; but Lengthening of Life requireth *Observation of Diets*.

The Explication.

Those things which come by *Accident*, as soon as the *Causes* are removed, cease again; but the continued Course of Nature, like a running River, requires a continual rowing and sailing against the stream. Therefore we must work regularly by *Diets*. Now *Diets* are of two kinds; *Set Diets*, which are to be observed at certain times; and *Familiar Diet*, which is to be admitted into our dayly *Repaist*: But the *Set Diets* are the more potent: That is, a course of *Medicines* for a time: For those things which are of so great vertue, that they are able to turn Nature back again; are, for the most part, more strong, and more speedily altering, than those which may without danger be received into a continual use. Now in the remedies set down in our *Intentions*, you shall

shall find only three *Set Diets*; The *Opiate Diet*, the *Diet Malacissant*, or *Suppling*; and the *Diet Emaciant*, and *Renewing*. But amongst those which we prescribed for *Familiar Diet*, & to be used daily, the most efficacious are these that follow; which also come not far short of the vertue of *Set Diets*. *Nitre*, & the *Subordinates to Nitre*; The *Regiment of the Affections*, and *Course of our Life*; *Refrigerators* which pass not by the *Stomach*; *Drinks Refridating*, or *engendring Oily Juices*; besprinkling of the blood with some *Firmer Matter*, as *Pearls*, certain *Woods*, competent *Functions* to keep out the *Air*, and to keep in the *Spirit*; *Heaters* from without, during the *Assimilation* after *sleep*; avoiding of those things which inflame the *Spirit* and put it into an *eager heat*, as *Wine* and *Spices*. Lastly, a moderate and seasonable use of those things which endue the *Spirits* with a *Robust heat*; as *Saffron*, *Cresset*, *Garlick*, *Elecampane*, and *Compound Opiates*.

Canon XXXI.

The Living Spirit is instantly extinguished, if it be deprived either of Motion, or of Refrigeration, or of Aliment.

The Explication.

Namely, these are those three which before we called the *Porches of Death*; and they are the proper and immediate passions of the *Spirit*. For all the *Organs* of the principal parts, serve hereunto; That these three *Offices* be performed and again, all destruction of the *Organs*, which is deadly, brings the *Matter* to this point, that one or more of these three fail. Therefore all other things are the divers wayes to *Death*, but they end in these three. Now the whole *Fabrick* of the *Parts* is the *Organ* of the *Spirit*, as the *Spirit* is the *Organ* of the *Reasonable Soul*; which is *Incorporeous* and *Divine*.

Canon XXXII.

Flame is a Momentary Substance, Air a Fixed; The Living Spirit in Creatures, is of a Middle Nature.

The Explication.

This Matter stands in need both of an higher Indagation, and of a longer Explication, than is pertinent to the present Inquisition. Mean while, we must know this; That *Flame* is almost every moment generated and extinguished; so that it is continued only by Succession: But *Air* is a *Fixed Body*, and is not dissolved; For though *Air* begets new *Air* out of watry moisture, yet notwithstanding the old *Air* still remains; whence cometh that *Super-Operation* of the *Air* whereof we have spoken in the Title, *De Ventis*; But *Spirit* is participant of both Natures; both of *Flame* and *Air*; even as the *Nourishments* thereof are; As well *Oyl* which is *Homogeneous* to *Flame*; As *Water* which is *Homogeneous* to *Air*; For the *spirit* is not nourished either of *Oyl* alone, or of *Watry* alone, but of both together; And though *Air* doth not agree well with *Flame*, nor *Oyl* with *Water*, yet in a mixt Body they agree well enough. Also the *spirit* hath from the *Air*, his easie and delicate Impressions and yeeldings; And from the *Flame* his Noble and Potent motions and activities. In like manner the *Duration* of *Spirit* is a *Mixed thing*; Being neither so *Momentary* as that of *Flame*; Nor so fixed as that of *Air*. And so much the rather it followeth not the condition of *Flame*; For that *Flame* it self is extinguished by Accident; namely, by *Contraries* and *Enemies* environing it; But *spirit* is not subject to the like Conditions and Necessities. Now the *spirit* is repaired from the lively and floride bloud of the small *Arteries*, which are intetted into the *Brain*; But this *Reparation* is done by a peculiar manner, of which we speak not now.

FINIS.





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Notes,

