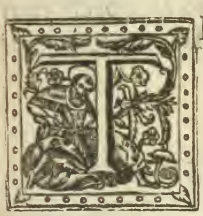
Robert Wilson


יהוה
Et vidit Deus lucem quod esset bona
Mundus Intellectualis
SYLVA SYLVARVM
or
A NATVRALL HISTORY
In ten Centuries.
Written by the right Honble Francis
Lo: Verulam Viscount S^ti Alban.
Published after ye Author^s Death
by W: RAWLEY D^r of Diuinity. &c
Tho: Cecill sculp:
LONDON
Printed for W: Lee and are to be sould at
the Great Turks head next to the Mytre
Taurne in Fleetstreet
Anno
1627

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 Maieſtie;



THe whole Body of the *Naturall Hiſtorie*, either deſigned, or written, by the late *Lo. Viſcount S. Alban,* was dedicated to your *Maieſtie*, in his Booke *De Ventis,* about foure yeeres paſt, when your *Maieſtie* was *Prince:* So as there needed no new Dedication of this *Worke,* but only, in all humbleneſſe, to let your *Maieſtie* know, it is yours. It is true, if that *Lo.* had liued, your *Maieſtie,* ere long, had beene inuoked, to the Protection of another *Hiſtorie*; Whereof,

Whereof, not *Natures Kingdome*, as in this, but these of your *Maiesties*, (during the Time and *Raigne* of *King Henry* the *Eighth*) had beene the Subiect: Which since it died vnder the Designation meerely, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to haue parted, for a while, with his Darling *Philosophie*, that hee might haue attended your Royall Commandement, in that other *Worke*. Thus much I haue beene bold, in all lowlinesse, to represent vnto your *Maiestie*, as one that was trusted with his *Lordships Writings*, euen to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties Royall Protection*, to make it more currant to the *World*; So vnder the *Protection* of this *Worke*, I presume in all humblenesse to approach your *Maiesties* presence; And to offer it vp into your *Sacred Hands*.

Your MAIESTIES most Loyall

and Deuoted Subiect,

W. RAWLEY.

SYLVA SYLVARVM:

Sylv OR Hovard

A Naturall Historie.

IN TEN CENTVRIES.

WRITTEN BY THE RIGHT *Honourable* FRANCIS Lo. Verulam Viscount St. ALBAN.

Published after the Authors death, *By* WILLIAM RAWLEY *Doctor of Diuinitie, late his* Lordships *Chaplaine*.

LONDON,
¶ Printed by *J. H.* for *William Lee* at the *Turks Head* in *Fleet-street*, next to the *Miter*. 1627.

To the Reader.

Auing had the Honour to be continually with my *Lord*, in compiling of this *Worke*; And to be employed therein; I haue thought it not amiſſe, (with his Lordſhips good leaue and liking,) for the better ſatisfaction of thoſe that ſhall reade it, to make knowne ſomewhat of his Lordſhips Intentions, touching the Ordering, and Publiſhing of the ſame. I haue heard his Lordſhip often ſay; that if hee ſhould haue ſerued the glory of his owne Name, he had been better not to haue publiſhed this *Naturall Hiſtory*: For it may ſeeme an Indigeſted Heap of Particulars; And cannot haue that Luſtre, which Bookes caſt into Methods haue: But that he reſolued to preferre the good of Men, and that which might beſt ſecure it, before any thing that might haue Relation to Himſelfe. And hee knew well, that ther was no other way open, to vnloose Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiuing Notions, and Theories; and therby made

Impotent for Generation of VVorkes; But onely no wher to depart from the Senſe, and cleare experience; But to keepe cloſe to it, eſpecially in the beginning: Beſides, this *Naturall Hiſtory* was a Debt of his, being Deſigned and ſet downe for a third part of the *Inſtauration*. I haue alſo heard his Lordſhip diſcourſe, that Men (no doubt) will thinke many of the *Experiments* conteined in this Collection, to bee Vulgar and Triuiall; Meane and Sordid; Curious and Fruitleſſe: And therfore he wiſheth, that they would haue perpetually before their Eyes, what is now in doing; And the Difference betweene this *Naturall Hiſtory*, and others. For thoſe *Naturall Hiſtories*, which are Extant, being gathered for Delight and Vſe, are full of pleaſant Deſcriptions and Pictures; and affect and ſeeke 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 *Vnderſtanding*; the Extracting of *Axiomes*; and the producing of many Noble *Works*, and *Effects*. For he hopeth, by this meanes, to acquit Himſelfe of that, for which hee taketh *Himſelfe* in a ſort bound; And that is, the Aduancement of all Learning and Sciences. For hauing in this preſent VVorke Collected the Materialls for the Building; And in his *Novum Organum* (of which his Lordſhip is yet to publiſh

a Second

a Second Part,) ſet downe the Inſtruments and Directions for the Worke; Men ſhall now bee wanting to themſelues, if they raiſe not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalfe, I haue heard his Lordſhip ſpeake complainingly; That his Lordſhip (who thinketh hee deſerueth to be an Architect in this building,) ſhould be forced to be a VVork-man and a Labourer; And to digge the Clay, and burne the Brick; And more then that, (according to the hard Condition of the *Iſraelites* at the latter end) to gather the Strawe and Stubble, ouer all the Fields, to burn the Bricks withall. For he knyweth, that except hee doe it, nothing will be done: Men are ſo ſett to deſpiſe the Meanes of their owne good. And as for the *Baſenes* of many of the Experiments; As long as they be Gods VVorks, they are Honourable enough. And for the *Vulgarnes* of them; true *Axiomes* muſt be drawne from plaine Experience, and not from doubtfull; And his Lordſhips courſe is, to make VVonders Plaine, and not Plaine things VVonders; And that Experience likewiſe muſt be broken and grinded, and not whole, or as it groweth. And for *Vſe*; his Lordſhip hath often in his Mouth, the two kindes of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments of Vſe*, and *Experiments of Light*; And he reporteth himſelf, whether he were not a ſtrange Man, that ſhould thinke that

Light hath no Vſe, becauſe it hath no Matter. Further, his Lordſhip thought good alſo, to add vnto many of the *Experiments* themſelues, ſome *Gloſſe* 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 Himſelfe, they are farr more certaine, then thoſe that are rendred by Others; Not for any Excellency of his owne VVitt, (as his Lordſhip is wont to ſay) but in reſpect of his continuall Conuerſation with *Nature*, and *Experience*. He did conſider likewiſe, that by this Addition of *Cauſes*, Mens mindes (which make ſo much haſt to find out the *Cauſes* of things;) would not think themſelues vtterly loſt, in a Vaſt VVood of *Experience*, but ſtay vpon theſe *Cauſes*, (ſuch as they are) a little, till true *Axiomes* may be more fully diſcouered. I haue heard his Lordſhip ſay alſo, that one great Reaſon, why he would not put theſe Particulars into any exact *Method*, (though he that looketh attentiuely into them, ſhall finde that they haue a ſecret Order) was, becauſe hee conceiued that other men would now thinke, that they could doe the like; And ſo goe on with a further Collection: which if the *Method* had been Exact, many would haue deſpaired to attaine by Imitation. As for his Lordſhips loue of Order, I can referr any Man to his Lordſhips Latine Booke, *De Augmentis Scientiarum*; which

which (if my Iudgment be any thing) is written in the Exacteſt Order, that I know any Writing to bee. I will conclude with an vſuall Speech of his Lordſhips. That this Worke of his *Naturall Hiſtory*, is the *World*, as God made it, and not as Men haue made it; For that it hath nothing of Imagination.

This Epiſtle is the ſame, that ſhould haue been prefixed to this Booke, if his Lordſhip had liued.

W: Rawley.

NATVRALL HISTORIE.

I. Century.

DIGG a *Pitt* vpon the *Sea shore*, somewhat aboue the High-water Marke, and sincke it as deepe as the Low-Water marke; And as the *Tide* commeth in, it will fill with *Water*, Fresh and Potable. This is commonly practized vpon the Coast of *Barbary*, where other fresh *Water* is wanting. And CÆSAR knew this well, when he was besieged in *Alexandria*: For by Digging of *Pitts* in the *Sea shoare*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea-Water* vpon the Wells of *Alexandria*; And so saued his Army, being then in Desperation. But *Cæsar* mistooke the Cause, For he thought that all *Sea-Sandes* had Naturall Springs of *Fresh Water*. But it is plaine, that it is the *Sea-Water*; because the Pitt filleth according to the Measure of the *Tide*: And the *Sea water* passing or Strayning through the Sandes, leaueth the Saltnesse.

1 Experiments in *Consort*, touching the Straining and Passing of Bodies, one through another: which they Call *Percolation*.

I remember to haue Read, that Triall hath beene made of *Salt Water* passed through *Earth*; through Tenn Vessells, one within an other, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another,) *Salt Water* drained through twenty Vessells, hath become Fresh. This *Experiment* seemeth to crosse that other of *Pitts*, made by the *Sea side*; And yet but in part, if it be true, that twentie Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of *Experiments*, except they be led by great Iudgement, and some good Light of *Axiomes*. For first, ther is no small difference betweene a

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Passage

Passage of *Water* through twenty small Vessells; And through such a distance, as betweene the Low water, and High water Marke. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides Earth doth not straine the Water so finely, as Sand doth. But ther is a Third Point, that I suspect as much, or more, then the other Two: And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pitts*, the *Water* riseth; But in the *Experiment* of Transmission of the *Water* through the Vessells, it falleth: Now certaine it is, that the Salter Part of *Water*, (once Salted throughout) goeth to the Bottome. And therfore no meruaile, if the Draining of *Water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike of the Salt part, then wher the *Water* sliideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation*; Not onely of Thicke from Thin; and Grosse from Fine,; But of more subtile Natures; And varieth according to the Bodie through which the *Transmission* is made. As if through a wollen Bagg, the Liquour leaueth the Fatnesse; It through Sand, the Saltnesse; &c. They speake of Seuering Wine from Water, passing it through Iuy wood, or through other the like porous Body; But *Non Constat*.

4 The *Gumm* of *Trees* (which wee see to be commonly shining and cleare) is but a fine Passage or *Straining* of the Iuice of the Tree, through the Wood and Bark. And in like manner, *Corn-sh Diamonds*, and *Rock Rubies*, (which are yet more resplendent then *Gumms*) are the fine Exudations of *Stone*.

5 *Aristotle* giueth the Cause, vainely, why the *Feathers* of *Birdes* are of more liuely Colours, then the *Haires* of *Beastes*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. He saith, It is, because *Birds* are more in the Beames of the Sunn, then *Beasts*; But that is manifestly vntrue; For *Cattle* are more in the Sun then *Birds*, that liue commonly in the Woods, or in some Couert: The true Cause is, that the Excrementious Moisture of liuing Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, then it doth in *Beastes*: For *Feathers* passe through Quills; And *Haire* through Skin.

6 The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleauing Body is Mixed and Agitated with the *Liquours*; wherby the grosser Part of the *Liquor* sticks to that Cleauing Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries* clarify their *Sirrupes* by whites of Eggs, beaten with the Iuices which they would clarify; which Whites of Eggs, gather all the Dreggs and grosser Parts of the Iuyce to them; And after the *Sirrupe* being sett on the Fire, the whites of Egges themselues harden, and are

are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about; And then passing it through a Wollen Bagge, which they call *Hippocrates Sleeue*: And the Cleauing Nature of the Milke draweth the Powder of the Spices, and Grosser parts of the *Liquour* to it; And in the passage they stick vpon the Woollen Bagge.

The *Clarifying* of *Water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *Water* is Crystaline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *Water* may straine through them. 7

It may be, *Percolation* doth not onely cause Clearenesse and Splendour, but Sweetnes of Sauour; For that also followeth, as well as Clearenes, when the Finer Parts are seuered from the Grosser. So it is found, that the Sweates of Men that haue much Heat, and exercise much, and haue cleane Bodies, and fine Skins, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gumms* haue sweet Odours. 8

Experiments in Consort touching *Motion* of *Bodies* vpon their *Pressure*.

TAke a *Glasse*, and put *Water* into it, and wett your Finger, and draw it round about the Lipp of the Glasse, pressing it somewhat hard; And after you haue drawne it some few times about; it will make the Water friske and sprinckle vp, in a fine Dew. This *Instance* doth excellently Demonstrate the Force of *Compression* in a Solid Body. For whensoeuer a Solid Body (as Wood, Stone, Metrall, &c.) is pressed, ther is an inward Tumult in the parts therof; seeking to deliuer themselues from the Compression: And this is the Cause of all *Violent Motion*. Wherin it is strange in the highest Degree, that this *Motion* hath neuer been obserued, nor inquired; It being of all *Motions*, the most Common, and the Chiefe Roote of all *Mechanicall Operations*. This *Motion* worketh in round at first, by way of Proofe, and Search, which way to deliuer it selfe; And then worketh in Progresse, wher it findeth the Deliuerance easiest. In *Liquours* this *Motion* is visible: For all Liquours strucken make round Circles, and withall Dash; but in *Solids*, (which breake not,) it is so subtile, as it is inuisible; But neuertheless bewrayeth it selfe by many Effects; As in this *Instance* wherof we speake. For the *Pressure* of the Finger furthered by the wetting (because it sticketh so much the better vnto the Lipp of the *Glasse*,) after some continuance, putteth all the small Parts of the *Glasse* into worke; that they strike the *Water* sharpely; from which *Percussion* that Sprinkling commeth. 9

If you strike or pierce a *Solid Body*, that is brittle, as *Glasse*, or *Sugar*, it breaketh not onely, wher the immediate force is; but breaketh all about into shiuers and fitters; The *Motion*, vpon the *Pressure*, searching all wayes; and breaking where it findeth the *Body* weakest. 10

The *Powder* in *Shot*, being Dilated into such a *Flame*, as endureth not *Compression*; Moueth likewise in round, (The *Flame* being in the Nature of a *liquid Body*:) Sometimes recoyling; Sometimes breaking the *Piece*; 11

But generally discharging the *Bullets*, because ther it findeth easiest Deliuerance.

12 This *Motion* vpon *Pressure*, and the Reciprocall therof, which is *Motion* vpon *Tensure*; we vse to call (by one common Name) *Motion of Libertie*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimension, deliuereth and restoreth it selfe to the Naturall: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloath* tentured spring backe. These two *Motions* (of which ther be infinite Instances,) we shall handle in due place.

13 This *Motion* vpon *Pressure* is excellently also demonstrated in *Sounds*; As when one Chimeth vpon a *Bell*, it soundeth; But as soon as he layeth his hand vpon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall String*, as soone as the Quill of the Iack falleth vpon it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts, of the *Bell*, or *String*, vpon the Aire; All one, as the *Water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasse*, vpon the Water, wherof we spake a little before in the 9th. *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*.

Experiments in *Consort* touching *Separations* of *Bodies by Weight*

TAke a *Glasse* with a *Belly* and a long *Nebb*; fill the *Belly* (in part) with *Water*: Take also another *Glasse*, wherein to put *Claret Wine* and *Water* mingled; Reverse the first *Glasse*, with the *Belly* vpwards, Stopping the *Nebb* with your fingar; Then dipp the Mouth of it within the Second *Glasse*, and remoue your Finger: Continue it in that

14 posture for a time; And it will vnmingle the *VVine* from the *Water*: The *VVine* ascending and setling in the topp of the vpper *Glasse*; And the *VVater* descending and setling in the bottome of the lower *Glasse*. The passage is apparent to the Eye; For you shall see the *VVine*, as it were, in a small veine, rising through the *VVater*. For handsomnesse sake (because the Working requireth some small time) it were good you hang the vpper *Glasse* vpon a Naile. But as soone as ther is gathered so much pure and vnmixed *water* in the Bottome of the Lower *Glasse*, as that the Mouth of the vpper *Glasse* dippeth into it, the *Motion* ceaseth.

15 Let the Vpper *Glasse* be *VVine*, and the Lower *VVater*; ther followeth no *Motion* at all. Lett the Vpper *Glasse* be *VVater* pure, the Lowwer *VVater* coloured; or contrariwise; ther followeth no *Motion* at all. But it hath been tried, that though the Mixture of *VVine* and *VVater*, in the Lower *Glasse*, be three parts *VVater*, and but one *VVine*; yet it doth not dead the *Motion*. This *Separation* of *VVater* and *VVine* appeareth to be made by *Weight*; for it must be of *Bodies* of vnequall *Weight*, or ells it worketh not; And the Heauier *Body* must euer be in the vpper *Glasse*. But then note withall, that the *VVater* being made pensile, and ther being a great *VVeight* of *VVater* in the *Belly* of the *Glasse*, sustained

by

by a small Pillar of *Water* in the Neck of the *Glasse*; It is that, which setteth the *Motion* on worke: For *Water* and *Wine* in one *Glasse*, with long standing, will hardly seuer.

This *Experiment* would be Extended from Mixtures of seuerall *Liquors*, to *Simple Bodies*, which Consist of seuerall Similare Parts: Try it therefore with *Broyne* or *Salt water*, and *Fresh water*; Placing the *Salt water* (which is the heauier) in the vpper *Glasse*; And see whether the *Fresh* will come aboue. Try it also with *Water thick Sugred*, and *Pure water*; and see whether the *water* which commeth aboue, will loose his Sweetnes: For which purpose it were good ther were a little Cock made in the Belly of the vpper *Glasse*. 16

Experiments in Consort touching *Iudicious & Accurate Infusions*, both in *Liquors*, and *Aire*.

IN *Bodies* containing Fine Spiritts, which doe easely dissipate, when you make *Infusions*, the Rule is; A short Stay of the *Body* in the *Liquour* receyueth the Spiritt; And a longer Stay confoundeth it; because it draweth forth the Earthy Part withall; which embaseth the finer. And therfore it is an Errour in *Physicians*, to rest simply vpon the Length of stay, for encreasing the vertue. But if you will haue the *Infusion* strong, in those kinde of *Bodies*, which haue fine Spiritts, your way is, not to giue Longer time, but to repeat the *Infusion* of the *Body* oftener: Take *Violetts*, and infuse a good Pugill of them in a Quart of Vineger; Lett them stay three quarters of an houre, and rake them forth; And refresh the *Infusion* with like quantity of new *Violetts*, seuen times; And it will make a Vineger so fresh of the *Flower*, as if a Twelue-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, then at first. 17

This Rule, which wee haue giuen, is of singular vse, for the Preparations of *Medecines*, and other *Infusions*. As for Example; the Leafe of *Burrage* hath an Excellent Spiritt, to represse the fuliginous Vapour of Dusky Melancholy, and so to cure Madnes: But neuertheless, if the Leafe be infused long, it yieldeth forth but a raw substance, of no Vertue; Therfore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it be Tunned, the *Burrage* stay a small time, and be often changed with fresh; It will make a Soueraigne Drink for Melancholy Passions. And the like I conceyue of *Orenge Flowers*. 18

Rubarb hath manifestly in it Parts of contrary Operations: Parts that purge; And parts that binde the body: And the first lay looser, and the latter lay deeper: So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and binde the Body lesse after the purging, then if it stood twenty foure houres; This is tried: But I conceiue likewise, that by Repeating the *Infusion* of *Rubarb*, seuerall times, (as was said of Violetts,) letting each stay in but a small time; you may make it as strong a *Purging Medecine*, as *Scammony*. And it is not a small thing wonn in *Phisick*, if you can make *Rubarb*, and other *Mede-* 19

cines that are *Benedict*, as strong Purgers, as those that are not without some Malignity.

20 *Purging Medecines*, for the most part, haue their *Purgatiue* Vertue, in a fine Spirit; As appeareth by that they indure not boiling, without much losse of vertue. And therfore it is of good vse in *Phisick*, if you can retaine the *Purging* Vertue, and take away the Vnpleasant tast of the *Purger*; which it is like you may doe, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Tast, is in the Grosser part.

21 Generally, the working by *Infusions*, is grosse and blinde, except you first try the Issuing of the seuerall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leaue that Quality, which you desire. This to know, ther be two waies; The one to try what long stay, and what short stay worketh, as hath been said: The other to try in Order, the succeeding *Infusions*, of one and the same Body, successiuely, in seuerall *Liquors*. As for example; Take *Orenge-Pills*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *Infuse* halfe an houre in *VVater*: Then take them out, and *Infuse* them againe in other *VVater*; 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 Weaknes, but otherwise in Tast, or Odour; For it may bee the *First water* will haue more of the Sent, as more Fragrant; And the *Second* more of the Tast, as more bitter or Biting, &c.

22 *Infusions* in *Aire*, (for so we may well call *Odours*) haue the same diuersities with *Infusions* in *VVater*; In that the seuerall *Odours* (which are in one Flower, or other Body) issue at seuerall times; Some earlier, some latter: So we finde that *Violetts*, *Woodbines*, *Strawberries*, yield a pleasing Sent, that commeth forth first; But soone after an ill Sent, quite differing from the Former; Which is caused, not so much by Mellowing, as by the late Issuing of the Grosser Spirit.

23 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 *VVine burnt*, by reason of the Evaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseth some of his poisonous Quallity, if it be vapoured out, mingled with *Spirit* of *Wine*, or the like: *Sean* leeseth somewhat of his windines by Decocting; And (generally) subtile or windy Spirits are taken off by Incension, or Evaporation. And euen in *Infusions* in things that are of too high a Spirit, you were better poure off the first *Infusion*, after a small time, and vse the latter.

Experiment Solitary touching the *Appetite* of *Continuation in Liquids*.

24 B*Vbbles* are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *VVater* without: And it seemeth somewhat strange, that the *Aire* should rise so swiftly, while it is in the *VVater*; And when it commeth to the topp, should be staid by so weake a Couer as that of the *Bubble* is. But as for the swift Ascent of the *Aire*, while it is vnder the

the *VVater*, that is a *Motion* of *Percussion* from the *VVater*; which it selfe descending, driueth vpp the Aire; and no *Motion* of *Leuity* in the *Aire*. And this *Democritus* 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 solide *Bodies* is strong) is also in *Liquours*, though fainter and weaker; As wee 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*, hauing obtained a little Degree of Tenacity by Mixture of Soape: Wee see it also in the *Stillicides* of *water*, which if ther be *water* enough to follow, will Drawe themselues into a small thredd, because they will not discontinue; But if ther be no Remedy, then they cast themselues into round Dropps; which is the Figure, that saueth the Body most from Discontinuance: The same Reason is of the Roundnes of the *Bubble*, as well for the Skin of *water*, as for the *Aire* within: For the *Aire* likewise auoideth *Discontinuance*; And therfore casteth it self into a Round Figure. And for the stopp and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Appetite, of Ascending.

Experiment Solitary touching the Making of *Artificiall Springs*. 25

THE Reiection, which I continually vse, of *Experiments*, (though it appeareth not) is infinit; But yet if an *Experiment* be probable in the Worke, and of great Vse, I receyue it, but deliuer it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Finde out a hanging Ground, wher ther is a good quick Fall of Raine-water. Lay a Half-Trough of Stone, of a good length, 3. or 4. foote deep within the same Ground; with one end vpon the high Ground, the other vpon the lowe. Couer the Trough with Brakes a good thicknes, and cast Sand vpon the Topp of the Brakes: You shall see, (saith he) that after some showers are past, the lower End of the Trough will runn like a *Spring* of *water*: which is no maruaile, if it hold, while the Raine-water lasteth; But he said it would continue long time after the Raine is past: As if the water did multiply it self vpon the Aire, by the helpe of the Coldnesse and Condensation of the Earth, and the Consort of the first Water.

Experiment Solitary touching the *Venemous Quality* of *Mans Flesh*. 26

THE *French*, (which put off the Name of the *French Disease*; vnto the Name of the *Disease* of *Naples*,) doe report, that at the Siege of *Naples*, ther were certaine wicked Merchants, that Barrelled vpp *Mans flesh*, (of some that had been, lately slaine in *Barbary*) and sold it for *Tunny*; And that vpon that foule and high Nourishment, was the Originall of that *Disease*. Which may well be; For that it is certaine, that the *Caniballs* in the *West Indies*, eate *Mans flesh*; And the *West Indies* were full of the Pockes when they were first discouered: And at this day the *Mortallest poisons*, practised by the *West Indians*, haue some Mixture of the Bloud, or Fatt, or Flesh of *Man*: And diuers Witches, and

Sorceresses, aswell amongst the *Heathen*, as amongst the *Christians*, haue fedd vpon *Mans flesh*, to aid (as it seemeth) their Imagination, with High and foule Vapours.

Experiment Solitary touching the *Version* and *Transmutation* of *Aire* into *Water*.

27

IT seemeth that ther be these waies (in likelihood) of *Version* of *Vapours*, or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly Condense; As wee see in the *Contracting of the Aire* in the *weather-Glasse*; whereby it is a Degree nearer to *water*. Wee see it also in the *Generation of Springs*, which the *Ancients* thought (very probably) to be made by the *Version* of *Aire* into *water*, holpen by the *Rest*, which the *Aire* hath in those Parts; wherby it cannot dissipate. And by the *Coldnes* of *Rockes*; for ther *Springs* are chiefly generated. Wee see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dews*, and *Raines*. And the Experiment of Turning *water* into *Ice*, by Snow, Nitre, and Salt, (wherof wee shall speake hereafter,) would be transferred to the Turning of *Aire* into *water*. The Second way is by *Compression*; As in *Stillatories*, wher the Vapour is turned back, vpon it self, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* vpon the Couers of *Boyling Potts*; And in the *Dew* towards *Raine*, vpon *Marble*, and *Wainscott*. But this is like to doe no great effect; Except it be vpon Vapours, and grosse *Aire*, that are allready very neare in Degree to Water. The Third is that, which may be searched into, but doth not yet appeare; which is, by *Mingling* of *moist Vapours* with *Aire*; And trying if they will not bring a Returne of more *Water*, then the *water* was at first: For if so; That Increase is a *version* of the *Aire*: Therfore putt water into the Bottome of a *Stillatory*, with the Nebb stopped; Weigh the *water* first; Hang in the Middle of the *Stillatory* a large *Spunge*; And see what Quantitie of *Water* you can crush out of it; And what it is more, or lesse, compared with the *water* spent; For you must vnderstand, that if any *Version* can be wrought, it will be easeliest done in small Pores: And that is the Reason why wee prescribe a *Spunge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receiuing the Aire* into the small *Pores of Bodies*; For (as hath been said) euery thing in small Quantity is more easy for *version*; And Tangible Bodies haue no pleasure in the Consort of *Aire*, but endeauour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, ther is nothing to succeed: Therfore it must be in *loose Bodies*, as *Sand*, and *Powder*; which wee see, if they lye close, of themselues gather Moisture.

Experiment Solitary touching *Helpes* towards the *Beauty* and *good Features* of *Persons*.

28

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into such a Cage, or Boxe, as they cannot rise to their Stature, but may encrease in Breadth, or length; will growe accordingly, as they can gett Roome: which if it be true, and faisible, and that the young *Creature* so pressed, and straightened,

tened, doth not therupon die; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange Figure. This is certaine, 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 preuent the Deformity of a Saddle Nose. Which obseruation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kindes, more comely, and better featured, then otherwise they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking vp the Calues of the Leggs, to keepe them from falling downe too lowe; And by Stroaking vp the Forehead to keepe them from being low-foreheaded. And it is a common Practise to swath Infants, that they may growe more straight, and better shaped: And wee see Young Women, by wearing straight Bodies, keepe themselues from being Grosse, and Corpulent.

Experiments Solitary touching the *Condensing* of *Aire*, in such sort as it may put on *Weight*, and yield *Nourishment*.

29

ONions, as they hang, will many of them shoot forth; And so will *Penniroiall*; And so will an Herb called *Orpin*, with which they vse, in the Country, to trimme 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 viue*, which will put out Branches, two or three yeares: But it is true, that commonly they wrapp the Root in a Cloth besmeared with *Oyle*, and renue it once in halfe a Yeare. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is; For that these *Plants* haue a Strong, Dense, and Succulent Moisture, which is not apt to exhale; And so is able, from the old store, without drawing helpe from the Earth, to suffice the sprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; 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 try whether these things, in the Sprouting, doe increase *Weight*; which must be tried, by weighing them before they be hangd vp; And afterwards againe, 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 Naturæ*; For it sheweth that *Aire* may be made so to be Condensed, as to be conuerted into a *Dense Body*; whereas the Race and Period of all things, here aboue the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also, that *Aire* can *Nourish*; which is another great Matter of Consequence. Note, that to try this, the *Experiment* of the *Semper-viue* must be made without Oiling the Cloth; For els, it may be, the *Plant* receiueth Nourishment from the Oile.

Flame

Experiment Solitary touching the *Cõmixture* of *Flame* and *Aire*, and the *great Force* therof.

30

FLame and *Aire* doe not Mingle, except it be in an *Instant*; Or in the *vitall Spiritts* of *vegetables*, and *liuing Creatures*. In *Gunpowder*, the Force of it hath been ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus farr it is true: And then (forsooth) it is become another Element; the Forme wherof occupieth more place; And so, of Neeesity, followeth a Dilatation: And therfore, lest two Bodies should be in one place, ther must needes also follow an Expulsion of the pellet; Or Blowing vp of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if ther were nothing els, except it were in very great quantity, will be suffocate with any hard Body, such as a Pellet is, Or the Barrell of a Gunn; 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 spread. But the Cause of this so potent a Motion, is the *Nitre*, (which wee call otherwise *Salt-Petre*;) which hauing in it a notable Crude and windy *Spirit*, first by the *Heate* of the *Fire* suddainly dilateth it self; (And wee knowe that simple *Aire*, being preternaturally attenuated by *Heate*, will make it self Roome, and breake and blowe vp that which resisteth it;) And Secondly, when the *Nitre* hath Dilated it self, it blowe thabroad the *Flame*, as an Inward Bellowes. And therfore wee see that *Brimstone*, *Pitch*, *Camphire*, *Wilde-Fire*, and diuers other Inflammable Matters, though they burne cruelly, and are hard to quench; Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, wee see that *Quick Siluer*, (which is a most Crude and Watry *Body*) heated, and pent in, hath the like force with *Gunpowder*. As for *liuing Creatures*, it is certaine, their *Vitall Spiritts* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* 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 *Oyle*; For they likewise will not well mingle of themselues, but in the Bodies of *Plants*, and *liuing Creatures*, they will. It is no maruaile therfore, that a small *Quantity* of *Spiritts*, in the Cells of the Braine, and Canales of the Sinewes, are able to moue the whole Body, (which is of so great Masse,) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnes, As in playing Diuision vpon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame*, when they incorporate.

Experiment Solitary touching the *Secret Nature* of *Flame*.

31

TAke a small *Waxe Candle*, and putt it in a Socket, of Brasse, or Iron; Then sett it vpright in a Porringer full of *Spiritt of Wine*, heated: Then sett both the *Candle*, and *Spiritt of Wine*, on fire, and you shall see the *Flame* of the *Candle*, open it self, and become 4. or 5. times bigger then otherwise it would haue been; and appeare in Figure *Globular*, and not in *Piramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not waxe any whitt blewe towardes the Colour of the Outward *flame* of the *Spiritt of Wine*. This is a Noble

Instance;

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend vpwards in one greatnesse, 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 *Aire* doth with *Aire*, or *Water* with *Water*, but only remaineth contiguous; As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a Piramis in *Flame*, which we vsually see, is meerely by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would be Round: And therefore *Smoake* is in the Figure of a Piramis Reuersed; For the *Aire* quencheth the *Flame*, and receiueth the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and moue vpwards, but moueth wauing, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as moue vpwards. By all which, it should seeme, that the Cælestiall 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 haue Rotation; And they haue the Colour and Splendour of *Flame*: So that *Flame* aboue is Durable, and Consistent, and in his Naturall place; But with vs, 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 commeth forth, you shall finde those Parts of the *Arrow*, which were on the Outsides of the *Flame*, more burned, blacked, and turned almost into a Coale; whereas that in the Middest of the *Flame*, will be, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discouery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the Sides, than in the Middest: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked, and pent. And therfore the *Peripatetickes* (howsoeuer their opinion of an *Element* of *Fire* aboue the *Aire* is iustly exploded;) in that Point they acquit themselues well: For being opposed, that if there were a *Spheare* of *Fire*, that incompassed the Earth so neare hand, it were impossible but all things should be burnt vp; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

Experiment Solitary touching the *Different force* of *Flame* in the *Middest* and on the *Sides*. 32

It is affirmed constantly by many, as an vsuall Experiment; That a *Lumpe* of *Vre*, in the *Bottome* of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the *Topp* of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tried to the full: For it is very probable, that the *Motion*

Experiment Solitary touching the *Decrease* of the *Naturall motion* of *Gravity* in *great distance from the Earth*; or *within some depth of the Earth*. 33

of Granitie worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Vnion 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 Mouing to a *Point* or Place (which was the Opinion of the *Ancients)* it is a meere Vanity.

Experiment Solitary touching the *Contraction* of *Bodies* in *Bulke*, by the *Mixture* of the more *Liquid Body* with the more *Solid*.
34

It is strange, how the *Ancients* tooke vp *Experiments* vpon credit, and yet did build great Matters vpon them. The Obseruation of some of the best of them, deliuered confidently is, That a *Vessell* filled with *Ashes*, will receiue the like quantity of *Water*, that it would haue done, if it had been empty. But this is vtterly vntrue; for the *Water* will not goe 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 pressed, will lye in lesse roome: And so the *Ashes* with Aire betweene, lye looser; and with *Water*, closer. For I haue not yet found certainly, that the *Water*, it selfe, by mixture of *Ashes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment Solitary touching the *Making Vines* more *fruitfull*.
35

It is reported of credit, that if you lay good store of *Kernells* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier, and prosper better. It may be tried with other *Kernells*, laid about the *Root* of a *Plant* of the same kinde; As *Figgs*, *Kernells* of *Apples*, &c. The Cause may be, for that the *Kernells* draw out of the Earth Iuice fit to nourish the *Tree*, as those that would be *Trees* of themselues, though there were no *Root*; But the *Root* being of greater strength, robbeth and deuoureth the Nourishment, when they haue drawne it: As great *Fishes* deuoure little.

Experiments in Consort touching *Purging Medicines*.
36

The *Operation* of *Purging Medicines*, and the *Causes* thereof, haue beene 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 Qualitie*, and the like Shifts of Ignorance. The *Causes* of *Purging* are diuers; All plaine and perspicuous; And throughly maintained by Experience. The first is, That whatsoeuer cannot be ouercome and disgested by the *Stomacke*, is by the *Stomacke*, either put vp by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulsion* in the *Stomacke*, and *Guts*, other *Parts of the Body*, (as the *Orifices* of the *Veines*, and the like) are moued to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomacke*, is caused either by the *Qualitie* of the *Medicine*, or by the *Quantitie*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Black Hellebore*, &c. And of *secret Malignity*, and disagreement towards *Mans Bodie*, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine*, that

that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to be held suspected, as a kinde of *Poyson*; For that it worketh either by *Corrosion*; or by a *secret Malignitie* and Enmitie to *Nature*: And therfore such *Medicines* are warily to be prepared, and vsed. The *Quantitie* of that which is taken, doth also cause *Purging*; As we see in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantitie of Meat*; For *Surfets* many times turne to *Purges*, both vpwards, and downwards. Therefore we see generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a proofe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantitie*.

A second *Cause* is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seene, that *Salt*, or any such thing that is sharpe and biting, put into the Fundament, doth prouoke the Part to expell; And *Mustard* prouoketh Sneezing: And any Sharpe Thing to the Eyes, prouoketh Teares. And therfore we see that almost all *Purgers* haue a kinde of *Twiching* and *vellication*, besides the *Griping* which commeth of wind. And if this *Mordication* be in an ouer-high Degree, it is little better than the *Corrosion* of *Poyson*; And it commeth to passe sometimes in *Antimony*; Especially if it be giuen, to Bodies not repleat with Humors; For where Humors abound, the Humors saue the Parts. 37

The third *Cause* is *Attraction*: For I doe not deny, but that *Purging Medicines* haue in them a direct Force of *Attraction*; As *Drawing Plasters* haue in *Surgery*: And we see *Sage*, or *Bettony brused*, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Physitians* call *Errhines*,) put into the Nose, draw Flegme, and water from the Head; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the Rheume downe by the Pallate. And by this Vertue, no doubt, some *Purgers* draw more one Humour, and some another, according to the Opinion receiued: As *Rubarb* draweth Choller; *Sean* Melancholy; *Agarick* Flegme; &c. But yet, (more or lesse) 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, & more fluide Humours; they that draw slow, worke vpon the more Tough, and Viscous Humours. And therfore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh only the Lightest part of the Humour away, and leaueth the Masse of Humours more obstinate. And the like may be said of *Worme-wood*, which is so much magnified. 38

The fourth *Cause* is *Flatuosity*; For *Wind* stirred moueth to expell: And we finde that (in effect) all *Purgers* haue in them a raw *Spirit*, or *Wind*; which is the Principall *Cause* of *Tortion* in the *Stomach*, and *Belly*. And therfore *Purgers* leese (most of them) the vertue, by Decoction vpon the Fire; And for that Cause are giuen chiefly in Infusion, Iuyce, or Powder. 39

40 The fifth *Cause* is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *Spunge*: So we see that *Taking Cold* moueth Loosenesse by Contraction of the Skinn, 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* haue it; And it may be the *Barkes of Peaches*; For this Vertue requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the Body; (For a pleasing *Astriction* doth rather Binde in the Humours, than Expell them:) And therfore such *Astriction* is found in Things of an Harrish Taste.

41 The Sixth *Cause* is *Lubrefaction*, and *Relaxation*. As we see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallowes*, *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 *Cold* relaxeth: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, breake, and dissolue. And by this kinde of *Relaxation*, *Feare* loosenethe the Belly; because the Heat retiring inwards towards the Heart, the Gutts and other Parts are relaxed; In the same manner, as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42 The Seuenth *Cause* is *Abstersion*; which is plainly a *Scouring off*, or *Incision* of the *more viscous Humors*, and making the *Humors* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulenesse. But this *Incision* must be by a *Sharpnesse*, without *Astriction*: Which wee finde in *Salt*, *Worm-wood*, *Oxymel*, and the like.

43 There be *Medicines*, that moue *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stoole* are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomach*, and therefore moue immediatly downwards to the *Gutts*; Or else are afterwards reiected by the *Mesentery Veines*, and so turne likewise downwards to the *Gutts*; and of these two kindes are most *Purgers*. But those that moue *Vrine*, are such, as are well digested of the *Stomach*, and well receiued also of the *Mesentery Veines*; So they come as farre as the *Liuer*, which sendeth *Vrine* to the *Bladder*, as the *Whey* of *Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liuer*, in sending downe the wheyey Part of the Bloud to the *Reines*. For *Medicines Vrinatiue* doe not worke by Reiection, and Indigestion, as *Solutiue* doe.

44 There be diuers *Medicines*, which in greater *Quantity*, moue *Stoole*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantity*, moue *Vrine*, and in Smaller, *Stoole*. Of the former sort is *Rubarb*, and some others. The *Cause* is, for that *Rubarb* is a *Medicine*, which the Stomach in a small Quantity doth digest, and ouercome, (being not Flatuous, nor Loathsome;) and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater Quantitie, the

the *Stomach* cannot ouercome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to be of the second sort; which being in small *Quantity*, moueth wind in the Stomach and Gutts, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *Wind*; And it selfe getteth to the *Mesentery veines*; And so to the *Liuer*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Wee haue spoken of *Euacuating* of the *Body*; wee will now speake something of the *Filling* of it by *Restoratiues* in *Consumptions*, and *Emsciating Diseases*. In *Vegetables*, there is one Part that is more Nourishing than another; As *Graines*, and *Roots* nourish more, than the *Leaues*; In so much as the *Order* of the *Foliatiues* was put downe by the *Pope*, as finding Leaues vnable to Nourish Mans Body. Whether there be that difference in the Flesh of *Liuing Creatures*, is not well inquired: As whether *Liuers*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liuer* was a great Delicacy; In so much as they had Artificiall Meanes to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceiue that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would bee a very *Nourishing Broth*: Wee finde also that *Scotch Skinck*, (which is a Pottage of strong Nourishment,) is made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Ielly* also, which they vse for a Restoratiue, is chiefly made of *Knuckles* of *Veale*. The *Pulp* that is within the *Crafish* or *Crabb*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crabb* or *Crafish*. The *Yolkes* of *Egges* are clearely more Nourishing than the *Whites*. So that it should seeme, that the Parts of *Liuing Creatures*, that lye more Inwards, nourish more than the Outward Flesh: Except it bee the *Braine*; which the Spirits prey too much vpon, to leaue it any great Vertue of Nourishing. It seemeth for the Nourishing of Aged Men, or Men in Consumptions, some such thing should be Deuised, as should be halfe *Chylus*, before it be put into the Stomach.

Experiments in Consort touching *Meats* and Drinks that are *most Nourishing*. 45

Take two large *Capons*; perboile them vpon a soft fire, by the space of an houre, or more, till in effect all the Bloud 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 oft the *Shanckes*, 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 foure gallons of Beere, of 8. ℥. strength, new as it commeth from the Tunning; Make in the Kilderkin a great Bung-hole of purpose: Then thrust into it, the Boulter (in which the *Capons* are) drawne out in length; Let it steepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then close the Bung-hole, and so let it continue, a Day and a halfe; Then draw 46

draw it into bottles, and you may drinke it well after three dayes Botteling; And it will last six weeks (approued.) It drinketh fresh, flowreth and mantleth exceedingly; It drinketh not newish at all; It is an excellent Drinke for a Consumption, to be drunke either alone, or Carded with some other Beere. It quencheth Thirst, and hath no whit of windinesse. Note, that it is not possible, that Meat and Bread, either in Broths, or taken with Drink, as is vsed, 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.

47 Triall would bee made of the like Brew with *Potado Roots*, or *Burr Roots*, or the *Pith* of *Artichoakes*, which are nourishing Meats: It may be tried also, with other flesh; As *Phesant*, *Partridge*, *Young Porke*, *Pigge*, *Venison*, especially of *young Deere*, &c.

48 A *Mortresse* made with the *Brawne* of *Capons*, stamped, and strained, and mingled (after it is made) with like quantitie, (at the least,) of *Almond Butter*; is an excellent Meat to Nourish those that are weake; Better than *Blanck-Manger*, or *Ielly*: And so is the *Cullice* of *Cocks*, boyled thick with the like Mixture of *Almond Butter*: For the *Mortresse*, or *Cullice*, of it selfe, is more Sauoury and strong; And not so fit for Nourishing of weake Bodies; But the *Almonds* that are not of so high a taste as *Flesh*, doe excellently qualifie it.

49 *Indian Maiz* hath (of certaine) an excellent Spirit of Nourishment; But it must be throughly boyled, and made into a *Maiz-Creame* like a *Barley Creame*. I iudge the same of *Rize*, made into a Creame; For *Rize* is in *Turky*, and other Countries of the East, most fed vpon; But it must be throughly boyled in respect of the Hardnesse of it: And also because otherwise it bindeth the Body too much.

50 *Pistachoes*, so they be good, and not musty, ioyned with *Almonds* in *Almond Milke*; Or made into a *Milke* of themselues, like vnto *Almond Milke*, but more greene, are an excellent Nourisher. But you shall doe well, to adde a little *Ginger*, scraped, because they are not without some subtill windinesse.

51 *Milke* 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 milke the Cow, two little bagges; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roses*; For they keepe the *Milke* somewhat from Turning, or Crudling in the stomach; And put in Sugar also, for the same cause, and partly for the Tasts sake; But you must drinke a good draught that it may stay lesse time in the stomach, lest it Cruddle: And let the Cup into which you milke the Cow, bee set in a greater Cup of hot water, that you may take it warme. And *Cow-milke* thus prepared, I iudge to be better for a *Consumption*, than *Asse-milke*, which (it is true) turneth not so easily, but it is a little harrish; Marry it is more proper for Sharpnesse of Vrine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans milke* likewise is prescribed, when all faile; but I commend it not; as being a little too neere the Iuyce of Mans Body,

dy, to be a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

Oyle of *Sweet Almonds*, newly drawen, with *Sugar*, and a little *Spice*, spread vpon Bread tosted, is an Excellent Nourisher; But then to keepe the *Oyle* from frying in the Stomach, you must drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomach too much, you must put in a little Powder of Cinnamon. 52

The *Yolkes* of *Eggs* are of themselues so well prepared by Nature for Nourishment; As (so they be Potched, or Reare boiled) they need no other Preparation, or Mixture; yet they may be taken also rawe, when they are new laid, with *Malmesey*, or *Sweet wine*; You shall doe well to put in some few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, besides the immediate Facultie of Nourishment, such Drinke will strengthen the Backe; So that it will not draw downe the *Vrine* too fast; For too much *Vrine* doth alwaies hinder Nourishment. 53

Mincing of meat, as in *Pies*, and *buttered Minced Meat*, saueth the Grinding of the Teeth; And therefore, (no doubt) it is more Nourishing; Especially in Age; Or to them that haue weake Teeth; But the Butter is not so proper for weake Bodies; And therfore it were good to moisten it with a little *Claret wine*, Pill of *Limon*, or *Orenge*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuetts*, which are likewise minced Meat, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistacho milke*; or *Barly*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reserue to the due place. 54

Wee haue hitherto handled the Particulars *which yeeld best, and easiest, and plentifullest Nourishment; And now we will speake of the best* Meanes *of Conueying, and Conuerting the Nourishment.*

The First *Meanes* is, to procure that the *Nourishment* may not be robbed, and drawen away; wherin that, which we haue already said, is very Materiall; To prouide, that the *Reines* draw not too strongly an ouer-great Part of the *Blood* into *Vrine*. To this adde that Precept of *Aristotle*, that *Wine* be forborne in all *Consumptions*; For that the *Spirits* of the *Wine*, doe prey vpon the Roscide Iuyce of the Body, and inter-common with the Spirits of the Body, and so deceiue and robbe them of their Nourishment. And therefore if the *Consumption* growing from the weakness of the Stomach, doe force you to vse *Wine*, let it alwaies be burnt, that the Quicker Spirits may euaporate; or at the least quenched with two little wedges of Gold, six or seuen times repeated. Adde also this Prouision, That there be not too much *Expence* of the *Nourishment*, by *Exhaling*, and *Sweating*: And therfore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to bee followed; who aduiseth quite contrary to that which is in vse: Namely, that the *Linnen*, or *Garment* next the Flesh, be in Winter drie, and oft 55

changed;

changed; And in Sommer seldome changed, and smeared ouer with Oyle; For certaine 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 haue the *Linnen* smeared lightly ouer, with *Oyle* of *Sweet Almonds*; And not to forbeare shifting as oft as is fit.

56 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*: Wherin it hath beene tried, that the *Quilts* of *Roses*, *Spices*, *Mastick*, *Wormewood*, *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 cleane Napkin, and to lay it to the Stomach: For it is certaine, that all Flower hath a potent Vertue of *Astriction*; In so much as it hardeneth a peece of flesh, or a Flower, that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lye long.

57 The Third *Meanes* (which may be a Branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For we see, that Beares, and other *Creatures* that *sleepe* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleeued) that *Sleepe* doth Nourish much; Both for that the Spirits do lesse spend the Nourishment in *Sleepe*, then when liuing *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 weake Bodies, and such as abound not with Choller, a short *Sleepe* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an ouer-hastie Disgestion, which is the Inconuenience of Postmeridian *Sleepes*. *Sleepe* also in the Morning, after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would bee done, sitting vpright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the Stomach.

58 The Fourth *Meanes* is to prouide that the Parts themselues may draw to them the Nourishment strongly. There is an Excellent Obseruation of *Aristotle*; That a great Reason, why Plants (some of them) are of greater Age, than *Liuing Creatures*, is, for that they yearely put forth new Leaues, and Boughes; whereas *Liuing Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailes; which are Excrements, and no Parts. And it is most certaine, that whatsoeuer is young, doth draw Nourishment better, than that which is Old; And then (that which is the Mystery of that Obseruation) young *Boughes*, and *Leaues*, calling the Sap vp to them; the same Nourisheth the *Body*, in the Passage. And this we see notably proued also, in that the oft Cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transferre therefore this Obseruation to the

Helping

Helping of Nourishment in *Liuing Creatures:* The Noblest and Principall Vse whereof is, for the *Prolongation* of *Life*; *Restauration* of some Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Liuing Creatures* Parts that Nourish, and Repaire easily; And Parts that Nourish and repaire hardly, And you must refresh, and renew those that are easie to Nourish, that the other may be refreshed, and (as it were) Drinke in Nourishment, in the Passage. Now wee see that *Draught Oxen*, put into good Pasture, recouer the Flesh of young Beefe; And Men after long Emaciating Diets, wax plumpe, and fat, and almost New: So that you may surely conclude, that the frequent and wise Vse of those *Emaciating Diets*, and of *Purgings*; And perhaps of some kinde of *Bleeding*; is a principall Meanes of *Prolongation* of *Life*; and *Restoring* some Degree of *Youth*: For as we haue often said, *Death* commeth vpon *Liuing Creatures* like the Torment of *Mezentius*;

Mortua quinetiam iungebat Corpora viuis,
Componens Manibus, atq; Oribus Ora.

For the Parts in Mans Body easily reparable, (as *Spirits*, *Bloud*, and *Flesh*,) die in the Embracement of the Parts hardly reparable, (as *Bones*, *Nerues*, and *Membranes*;) And likewise some *Entrails* (which they reckon amongst the *Spermaticall Parts*) are hard to repaire: Though that Diuision of *Spermaticall*, and *Menstruall Parts*, be but a Conceit. And this same *Obseruation* also may be drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Frication* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; whereby they call forth Nourishment the better. This *Frication* I wish to be done in the Morning. It is also best done by the *Hand*, or a peece of *Scarlet wool*, wet a little with *Oile* 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.

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 haue compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The vse of it would be betweene Sleepes; For in the latter Sleepe the Parts Assimilate chiefly. 59

There be many *Medicines*, which by themselues would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I haue tried (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driuen it away in 24. Houres space: It is first to apply a *Pultasse*; Of which *vide* the *Receit*; And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaister*, *vide* the *Receit*. The *Pultasse* 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 *Pultasse*, Draweth gently; And therefore draweth the Humour out; and doth not draw more to it; For it is

Experiment Solitary touching *Filum Medicinale*. 60

is a *Gentle Fomentation*, and hath withall a Mixture, (though very little) of some *Stupefactine*. The *Plaister* is a Moderate *Astringent Plaister*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The *Plaister* 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 *Pultasse* is to be laid to for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being vsed hot, and seuen or eight times repeated: The *Plaister* to continue on still, till the Part be well confirmed.

Experiment Solitary touching *Cure by Custome*. 61

There is a secret Way of *Cure*, (vnpractized;) By *Assuetude* of that which in it selfe hurteth. *Poysons* haue beene made, by some, Familiar, as hath beene said. *Ordinary keepers* of the *Sicke* of the *Plague*, are seldome infected. *Enduring* of *Torture*, by *Custome*, hath been made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *Wine* or *Strong Drinke*, hath beene, by *Custome*, made to be without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palseyes*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Iust Cure of it be not full of perill; And if he finde it to bee such, let him resort to *Palliation*; And alleuiate the *Symptome*, without busying himselfe too much with the perfect *Cure*: And many times, (if the *Patient* be indeed patient,) that Course will exceed all Expectation. Likewise the *Patient* himselfe may striue, by little and little, to Ouercome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment Solitary touching *Cure by Excesse*. 62

Diuers *Diseases*, especially *Chronicall*, (such as *Quartan Agues*;) are somtimes cured by *Surfet*, and *Excesses*; As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, & the like. The Cause is, for that *Diseases* of *Cõtinuance* get an Adẽtitious Strength frõ Custome, besides their *Materiall Cause* from the *Humeurs*: So that the *Breaking* of the *Custome* doth leaue them only to their first *Cause*; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment Solitary touching *Cure* by *Motion* of *Consent*. 63

There is in the Body of Man a great *Consent* in the *Motion* of the seuerall Parts. We see, it is Childrens sport, to prouе whether they can rub vpon their Brest with one hand, and pat vpon their Fore-head with another; And straight-waies, they shall sometimes rubbe with both Hands, or pat with both hands. We see, that when the Spirits, that come to the Nosthrills, expell a bad Sent, the Stomach is ready to Expell

pell by Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Pestilent Diseases*, if they cannot be expelled by *Sweat*, they fall likewise into *Loosenesse*, and that is commonly Mortall. Therfore *Physitians* should ingeniously contriue, 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*.

Hippocrates Aphorisme, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sexe*, *Season of the yeare*, *Diet*, &c. are more dangerous, than those that are Concurrent. A Man would thinke it should be otherwise; For that, when the *Accident of Sicknesse*, and the *Naturall Disposition*, doe 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* doe shew a greater *Collection of Matter*, by that they are able to ouercome those *Naturall Inclinations* to the Contrary. And therefore in *Diseases* of that kinde, let the *Physitian* apply himselfe more to *Purgation*, than to *Alteration*; Because the Offence is in the *Quantity*; and the *Qualities* are rectified of themselues.

Experiment Solitary touching *Cure* of *Diseases which are contrary to Predisposition*. 64

Physitians do wisely prescribe, that there be *Preparatiues* vsed before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body be not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not comming faire 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 selfe, that it purgeth not sufficiently. Therefore the worke of *Preparation* is double; To make the *Humours fluide*, and mature; And to make the *Passages* more open: For both those helpe to make the Humours passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clisters* also helpe, lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*; And *fat Bodies*; And *Open weather*; are *Preparatiues* in themselues; because they make the Humours more fluide. But let a *Physitian* beware, how he purge after hard *Frostie Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in *ill Places*: For it is certaine, that there be *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially Passages,) doe much mischiefe. Therefore it is good, after *Purging*, to vse *Apozumes*, and *Broths*, not so much *Opening* as those vsed before *Purging*, but *Abstersiue* and

Experiment Solitary touching *Preparations* before *Purging*, and *settling* of the *Body* afterward. 65

Mundifying Clisters also are good to conclude with, to draw away the Reliques of the Humours, that may haue descended to the *Lower Region* of the *Body*.

Experiment Solitary touching *Stanching of Bloud.* 66

Bloud is stanched diuers waies. First by *Astringents*, and *Repercussiue Medicines*. Secondly by *Drawing* of the *Spirits* and *Bloud 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 beene tryed, that the *Testicles*, being put into sharp Vineger, hath made a suddaine Recesse of the Spirits, and stanched Bloud. Thirdly by the *Recesse of the Bloud by Sympathy*. So it hath beene tried, that the part that bleedeth, being thrust into the Body of a Capon, or Sheepe, new ript and bleeding, hath stanched *Bloud*; The *Bloud*, as it seemeth, sucking and drawing vp, by similitude of substance, the *Bloud* it meeteth with, and so it selfe going backe. Fourthly by Custome and Time; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could finde no meanes to stanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to haue the *Orifice* of the *Wound* stopped by *Mens Thumbes*, succeeding one another, for the space at least of two Dayes; And at the last the bloud by *Custome* onely retired. There is a fifth Way also in vse, to let *Bloud* in an *Aduerse Part*, for a *Reuulsion*.

Experiment Solitary touching *Change* of *Aliments* and *Medicines*. 67

It helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine* & *Aliment* still. The Cause is, for that *Nature* by continuall Vse of any Thing, groweth to a *Saciete*, and *Dulnesse*, 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 vse some haue brought themselues to brooke. And therefore it is no maruaile, though *Things helpfull*, by *Custome*, leese their force to Helpe. I count *Intermission* almost the same thing with *Change*; For that, that hath beene intermitted, is after a fort new.

Experiment Solitary touching *Diets.* 68

It is found by Experience, that in *Diets of Guaiacum*, *Sarza*, and the like (especially if they be strict,) the *Patient* is more troubled in the beginning, then after continuance; Which hath made some of the more delicate Sort of patients, giue them ouer in the middest; Supposing that if those Diets trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, doe drie vp *Humours*, *Rheumes*, and the like; And they cannot Drie vp vntil they haue first attenuated; And while the *Humour* is attenuated, it is more Fluid, then it was before, and troubleth the Body a great deale more, vntill it be dried vp, and consumed. And therefore *Patients* must expect a due time, and not checke at them at the first.

Experiments in Consort touching the *Production* of *Cold*.

The *Producing* of *Cold* is a thing very worthy the Inquisition; both for Vse, and Disclosure of Causes. For *Heat* and

Cold

Cold are *Natures* two Hands, whereby ſhe chiefly worketh: And *Heat* we haue in readineſſe, in reſpect of the *Fire*; But for *Cold* we muſt ſtaie till it commeth; or ſeeke it in deepe Caues, or high Mountaines: And when all is done, we cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farre hotter, then a *Sommers Sunne*; But *Vaults*, or *Hills* are not much Colder then a *Winters Froſt*.

The firſt *Meanes* of *Producing Cold*, is that which *Nature* preſenteth vs withall; Namely the *Expiring* of *Cold* out of the *Inward Parts of the Earth* in *Winter*, when the Sun hath no power to ouercome it; the *Earth* being (as hath beene noted by ſome) *Primum Frigidum*. This hath beene 69
asserted, as well by Auncient as by Moderne *Philoſophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Authour* of the diſcourſe in *Plutarch* (for I take it that booke was not *Plutarches* owne) *De primo Frigido*. It was the opinion of *Teleſius*, who hath renewed the *Philoſophy* of *Parmenides*, and is the beſt of the *Nouelliſts*.

The Second *Cauſe* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is
Actiue and Tranſitiue into Bodies Adiacent, as well as *Heat*; which is 70
ſeene in thoſe things that are touched with *Snow* or *Cold water*. And therefore, whoſoeuer will be an *Inquirer* into *Nature*, let him reſort to a *Conſeruatory* of *Snow* and *Ice*; Such as they *vſe for delicacy*, to coole Wine in Summer: Which is a Poore and Contemptible vſe, in reſpect of other vſes, that may bee made of ſuch *Conſeruatories*.

The Third *Cauſe* is the *Primary Nature* of all *Tangible bodies*: For it is
well to be noted, that all Things whatſoeuer (*Tangible*) are of themſelues 71
Cold; Exeept they haue an Acceſſory *Heat* by *fire*, *Life*; or *Motion*: For euen the *Spirit* of *Wine*, or *Chymicall Oyles*, which are ſo hot in Operation, are to the firſt Touch *Cold*; And *Aire* it ſelfe compreſſed, and Condenſed a little by blowing, is *Cold*.

The Fourth *Cauſe* is the *Denſity of the Body*; For all *Denſe Bodies* are
Colder then moſt other *Bodies*; As *Mettalls*, *Stone*, *Glaſſe*; And they are lon- 72
ger in *Heating* than *Soſter Bodies*. And it is certaine, 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.

The Fifth *Cauſe* of *Cold*, or rather of increaſe and vehemence of
Cold, is a *Quicke Spirit incloſed in a Cold Body*: As will appeare to any that 73
ſhall attentiuely conſider of *Nature* in many Inſtances. Wee ſee *Nitre* (which hath a *Quicke Spirit*) is Cold; more *Cold* to the Tongue, then a Stone; So *Water* is *Colder* then *Oile*, becauſe it hath *a Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digeſted then *Water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* then *Water*, becauſe it hath *more Spirit* within it: So we ſee that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaſeth the *Actiuity* of *Cold*: So ſome *Inſecta* which haue

Spirit

Spirit of *Life*, as *Snakes*, and *Silkwormes*, are, to the touch, *Cold*. So *Quick-siluer* is the *Coldest* of Mettals, because it is *fullest of Spirit*.

74 The Sixth *Cause* of *Cold* is *the Chasing and Driuing away of Spirits*, such as haue some *Degree of Heat*: For the Banishing of the *Heat* must needs leane any Body *Cold*. This we see in the Operation of *Opium*, and *Stupefactiues*, vpon the Spirits of liuing Creatures: And it were not amisse to trie *Opium*, by laying it vpon the Top of a *Weather-glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a Body as Glasse, I conceiue that *Opium*, and the like, make the *Spirits* fly rather by *Malignity*, then by *Cold*.

75 Seuenthly, the same *Effect* must follow vpon the *Exhaling or Drawing out of the warme Spirits*, that doth vpon the Flight of the Spirits. There is an Opinion, that the *Moone* is Magneticall of *Heat*, as the *Sun* is of *Cold*, and *Moisture*: It were not amisse therefore to trie it, with *Warme waters*; The one exposed to the Beames of the *Moone*; the other with some Skreene betwixt the Beames of the *Moone* and the *water*; As we vse to the *Sunne* for Shade; And to see whether the former will coole sooner. And it were also good to inquire, what other Meanes there may be, to draw forth the *Exile heat*, which is in the *Aire*; for that may be a Secret of great Power to Produce *Cold weather*.

Experiments in Cõsort touching the *Version* and *Transmutation of Aire into water*.

We haue formerly set downe the *Meanes of turning Aire into water*, in the *Experiment* 27. But because it is *Magnale Naturæ*; And tendeth to the subduing of a very great effect; And is also of Manifold vse; we will adde some *Instances* in *Consort* that giue light thereunto.

76 It is reported by some of the *Ancients*, that *Sailers* haue vsed, euery Night, to hang *Fleeces of wooll* on the sides of their *Ships*, the *Wooll* towards the water; And that they haue crushed fresh Water out of them, in the Morning, for their vse. And thus much we haue tried, that a *Quantitie* of *Wooll* tied loose together, being let downe into a deepe *Well*; And hanging in the *Middle*, some three Fathome from the water, for a night, in the Winter time; increased in weight, (as I now remember) to a fifth Part.

77 It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certaine *Worke-men*, in time of *Warres*, fled into *Caues*; And the Mouth of the *Caues* 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 vnder Earth*, (in Caues,) for long time; And of *version* also (as it should seeme,) of *Aire* into *Water*; if any of those vessels were Emptie. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunke; you may be sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would be in a *Cave* vnder *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 *Cloues* are kept, it will be drawne dry in 24. houres; Though it stand at some distance from the *Cloues*. In the Countrey, they vse many times, in deceit, when their *wooll* is new shorne, to set some Pailes of *water* by, in the same Roome; to increase the weight of the *wooll*: But it may be, that the Heat of the *wooll*, remaining from the body of the Sheepe; or the Heat gathered by the lying close of the *wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*. 78

It is Reported also credibly, that *wooll* new shorne, being laid casually vpon a *Vessell* of *Veriuyce*, after some time, had drunke vp a great part of the *Veriuyce*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (vpon the by) to be noted, the *Percolation*, or *Suing* of the *Veriuyce* through the wood; For *Veriuyce* of it selfe would neuer haue passed thorow the wood: So as, it seemeth, it must be first in a kinde of Vapour, before it passe. 79

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* haue an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they haue drawne it, they will condense it more, and in effect incorporate it; For wee see that a *Spunge*, or *wooll*, or *Sugar*, or a *woollen cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquour* higher, and beyond the place, where the *water* or *wine* commeth. We see also, that *Wood*, *Lute-strings*, and the like, doe 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 kinde of *Infusion*: And is much like to an *Infusion* in water, which will make wood to swell: As we see in the Filling of the Chops of Boules, by laying them in water. But for that part of these *Experiments*, which concerneth *Attraction*; we will reserue it to the proper *Title* of *Attraction*. 80

There is also a *Version of Aire into water*, seene 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 Aire thickned against the hard body. But it is plaine, that it is the latter; For that we see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse; which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. We see also, that *Breathing* vpon a *Glasse*, or Smooth body, giueth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew vpon the 81

the Inside of Glasse-windowes; And the *Frost* it selfe vpon the ground is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*.

82 It is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer vnto *water*. Therefore trie the *Experiment* of the *Artificiall Turning water into Ice* (whereof we shall speake in another place) with *Aire* in place of *water*, and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *water*, than *water* into *Ice*: yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that Artificiall *Conuersion* of *water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments in Consort, touching *Induration 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 inquired. It is effected by three Meanes. The first is by *Cold*; whose Property is to *Condense*, and constipate, as hath beene 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 vpon that, the more grosse of the Tangible Parts doe contract and serre themselues together; Both to Auoid *Vacuum* (as they call it;) And also to Munite themselues against the Force of the *Fire*, which they haue 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 *Mineralls*, which come (no doubt) at first, of Iuyces 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 *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden

den with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But wee will speake of them distinctly.

For *Indurations* by *Cold*, there bee few Trialls of it; For wee haue no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the Sunne, and the Heauens. The likeliest Triall is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* actiuated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may be, it will turne *wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conseruing Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*,) a Peece of *Wood*, or a Peece of *Tough Clay*, and let it lye a Moneth, or more. 83

Another Triall is by *Metalline waters*, which haue virtuall *Cold* in them. Put therefore *Wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And try whether it will not harden in some reasonable time. But I vnderstand it, of *Metalline waters*, that come by Washing, or Quenching; And not of *Strong Waters* that come by dissolution; for they are too Corrosiue to consolidate. 84

It is already found, that there are some *Naturall Spring-waters*, that will Inlapidate *Wood*; So as you shall see one peece of *Wood*, whereof the Part aboue the *Water* shall continue *Wood*; And the Part vnder the *Water* shall be turned into a kinde of *Grauelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would be more particular Inquiry made of them. It is certaine, that an *Egge* was found, hauing lien many yeeres in the bottome of a Moate, where the Earth had somewhat ouergrowen it; And this Egge was comen to the Hardnesse of a *Stone*; And had the Colours of the white and yolke perfect: And the Shell shining in small graines like Sugar, or Alablaster. 85

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Mettalls*, themselues are hardned by often *Heating* and *Quenching* in *Cold Water*: For *Cold* euer worketh most potently vpon *Heat* precedent. 86

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Exhaling of the Moister Parts, doth either harden the Body; As in *Bricks*, *Tiles*, &c; Or if the *Heat* be more fierce, maketh the grosser part it selfe, Runne and Melt; As in the making of ordinary *Glasse*; And in the *Vitrification* of *Earth*, (As wee see in the Inner Parts of *Furnaces*;) And in the *Vitrification* of *Brick*; And of *Mettalls*. And in the former of these, which is the Hardening by baking, without Melting, the *Heat* hath these degrees; First it *Indurateth*; and then maketh *Fragile*; And lastly it doth *Incinerate* and *Calcinate*. 87

But if you desire to make an *Induration* with *Toughnesse*, and lesse Fragility; A middle way would be taken; Which is that which *Aristotle* hath well noted; But would be throughly verified. It is, to decoct *Bodies* in 88

 water,

water, for two or three dayes; But they muſt bee ſuch Bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *Water* wil enter, then long Seething, will rather Soften than indurate them. As hath beene tried, in *Eggs* &c. Therefore, Softer *Bodies* muſt be put into Bottles; And the Bottles hung into Water ſeething, with the mouths open, aboue 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* wee made; And it ſorted thus. It was tried with a Peece of *Free-ſtone*, and with *Pewter*, put into the *Water* at large. The *Free-ſtone* we found receiued in ſome *water*; For it was ſofter, and eaſier to ſcrape, then a peece of the ſame *Stone* kept drie. But the *Pewter* into which no *water* could enter, became more white, and liker to Siluer, and leſſe flexible, by much. There were alſo put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheeſe*, a Peece of *Chalke*, and a Peece of *Free-ſtone*. The *Clay* came forth almoſt of the Hardneſſe of *Stone*; The *Cheeſe* likewiſe very hard, and not well to be cut: The *Chalke* and the *Free-ſtone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trialls were made by a Boyling vpon a good hot Fire, renewing the *water* as it conſumed, with other hot *water*; But the Boyling was but for twelue houres onely; And it is like that the Experiment would haue beene more effectuall, if the Boyling had beene for two or three daies, as we preſcribed before.

89 As touching *Aſſimilation*, (for there is a degree of *Aſſimilation* euen in Inanimate bodies) wee ſee Examples of it in ſome *Stones* in *Clay-Grounds*, lying neare to the top of the Earth, where *Pebble is*; In which you may manifeſtly ſee diuers *Pebbles* gathered together, and a Cruſt of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themſelues: And it were good to make a Triall of purpoſe, by taking *Clay*, and putting in it diuers *Pebble-Stones*, thicke ſet, to ſee whether in continuance of time, it will not be harder then other *Clay* of the ſame lump, in which no *Pebbles* are ſet. Wee ſee alſo in Ruines of old Walls, eſpecially towards the bottome, the *Morter* will become as hard as the *Brick*; wee ſee alſo, that the *Wood* on the ſides of *Veſſels* of *Wine*, gathereth a Cruſt of *Tartar*, harder then the *wood* it ſelfe; And Scales likewiſe grow to the *Teeth*, harder then the *Teeth* themſelues.

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

Experiment Solitary touching the *Verſion of water into Aire.*

91 The Eye of the vnderſtanding, is like the Eye of the Senſe: For as you may ſee great Obiects through ſmall Crannies, or Leuells; So you may

may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* vpon *watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh vp suddenly. But the like *Cloud*, if it were *Oyly*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth vpon *Water*; And *Flame*, and *Fire*, vpon *Oyle*; And therefore, to take out a Spot of Grease, they vse a *Coale* vpon browne Paper; because *Fire* worketh vpon Grease, or *Oyle*, as *Aire* doth vpon *Water*. And we see *Paper oyled*, or *Wood oyled*, or the like, last long moist; but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* meddleth little with the *Moisture* of *Oyle*.

There is an Admirable demonstration, in the same trifling *Instance* of the *little Cloud* vpon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force of Vnion*, euen in the least Quantities, and weakest Bodies, how much it Conduceth to Preseruation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it euer breake vp, first in the Skirts, and last in the middest. We see likewise, that much *Water* draweth forth the Iuyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation vpon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiueth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Actiue Body, that should subdue it.

Experiment Solitary touching the *Force of Vnion*. 92

We haue 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 endeuour to reduce the same *Axiome* to a *Worke*. For this Writing of our *Sylua Sylularum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description only of Nature, but a Breaking of Nature, into great and strange Workes. Trie therefore, the Anointing ouer of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelps*, cutting their Haire 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 sticke very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is receiued, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *White* is a penurious Colour, & where Moisture is scant. So *Blew Violets*, & other *Flowers*, if they be starued, turne Pale and *white*; *Birds*, and *Horses*, by Age, or Scarres, turne *white*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that

Experiment Solitary touching the *Producing of Feathers and Haires of diuers Colours*. 93

come first, will be many times of diuers 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* themselues; which of them require a finer Porositie, and which a grosser.

Experiment Solitary touching the *Nourishment of Liuing Creatures before they be brought forth.*

94 It is a worke of Prouidence, that hath beene truly obserued by some; That the *Yolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Yolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe; haue in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and seuered from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But onely a quickening *Heat* when shee sitteth. But Beasts, and Men need not the matter of Nourishment within themselues; Because they are shaped within the Wombe of the Female, and are Nourished continually from her Body.

Experiments in Cõsort touching *Sympathy and Antipathy for Medicinall vse.*

95 It is an Inueterate and receiued Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Receiued, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to moue Grauell, and to dissolue the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe Grauell, as Men haue beene glad to remoue it; It was so violent.

96 It is receiued and confirmed by daily Experience, that the *Soales* of the *Feet* haue great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As we see, *Going wet-shod*, to those that vse it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mysticall, prescribeth, for the Cure of the *Rheume*, that a Man should walke Continually vpon a *Camomill Alley*; Meaning, that he should put *Camomill* within his Sockes. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applied vnto them, prouoke *Sleepe*.

97 It seemeth, that as the *Feet* haue a Sympathy with the *Head*; So the *Wrests* and *Hands*, haue 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 tried, that Iuyces of *Stock-Gilly-Flowers*, *Rose-Campian*, *Garlicke*, and other things; applied to the *Wrests*, and renewed; haue cured long *Agues*. And I conceiue, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the Hands, *Egges of Alablaster*, and *Balls* of *Crystall*.

Of these things we shall speake more, when we handle the Title *of* Sympathy *and* Antipathy, *in the proper Place.*

The

Experiment Solitary touching the *Secret Processes of Nature.*

98

The Knowledge of man (hitherto) hath beene determined by the View, or Sight; So that whatsoeuer is Inuisible, either in respect of the *Fineuesse of the Body* it selfe; Or the *Smallnesse of the Parts*; Or of the *Subtilty of the Motion*; is little inquired. And yet these be the Things that Gouerne Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumaticals*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Actiue of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will haue them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Wheras some of them are crude, and cold. And sometimes they will haue them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselues. And then, when they come to Plants and liuing Creatures, they call them *Soules*. And such Superficiall Speculations they haue; Like Prospectiues, 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 *Naturall Body*, ratified to a Proportion, & included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoeuer, more or lesse: And they are neuer (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Viuification*, and most of the Effects of *Nature*: For, as we haue figured them in our *Sapientia Veterum*, in the *Fable* of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath giuen some light, in discerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge, that *Herbs*, and *Drugs* haue diuers Parts; As that *Opium* hath a Stupefactiue Part, and a Hearing Part; The one mouing Sleepe, 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 subtill 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 doe so great Effects, they haue not beene obserued at all; because they are Inuisible, and incurre not to the Eye; 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 seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiæ esse conuincitur*; *Atomum enim nemo vnquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all

Flight

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be throughly handled in due place,) is not seene at all. But neuertheleſſe, if you know it not, or enquire it not attentiuely and diligently, you ſhall neuer be able to discerne, and much leſſe to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Encloſures of Bodies, wherby the effects (which were mentioned before) paſſe betweene the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *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.

Experiment Solitary touching the *Power of Heat*. 99

It is certaine, that of all *Powers* in *Nature*, *Heat* is the chieſe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewiſe, that the Effects of *Heat*, are moſt aduanced, when it worketh vpon a Body, without loſſe or diſſipation of the Matter; for that euer betrayeth the Account. And therefore it is true, that the power of *Heat* is beſt perceiued in *Diſtillations*, which are performed in cloſe Veſſels, and Receptacles. But yet there is a higher Degree; For howſoeuer *Diſtillations* doe keepe the Body in Cells, and Cloiſters, without Going abroad; yet they giue ſpace vnto Bodies to turne into Vapour; To returne into Liquour; And to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Liberty: wherby the true and Vltime 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 Sleeues, will turne and change into many *Metamorphoſes*. Take therefore a *Square Veſſell* of *Iron*, in forme of a Cube, and let it haue good thicke and ſtrong Sides. Put into it a Cube of *Wood*, that may fill it as cloſe as may be; And let it haue a Couer 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 *Coales*, kept quicke kindled, for ſome few houres ſpace. Then take the *Veſſell* from the *Fire*, and take off the Couer, and ſee what is become of the *Wood*. I conceiue that ſince all *Inflammation*, and *Euaporation* are vtterly prohibited, and the *Body* ſtill turned vpon it Selfe, that one of theſe two Effects will follow: Either that the *Body* of the *Wood* will be turned into a kinde of *Amalgama*, (as the *Chymiſts* call it;) Or that the Finer Part will bee turned into *Aire*, and the Groſſer ſticke as it were baked, and incruſtate vpon the Sides of the *Veſſell*; being become of a Denſer Matter, than the *Wood* it ſelfe, Crude. And for another Triall, take alſo *Water*, and put it in the like Veſſell, ſtopped as before; But vſe a gentler *Heat*, and remoue the veſſell ſometimes from the Fire; And againe, after ſome ſmall time, when it is Cold, renue the *Heating* of it: And repeat this *Alteration* ſome few times: And if you can once bring to paſſe, that the *Water*, which is one of the Simpleſt of Bodies, be changed in Colour, Odour, or Taſte, after

after the manner of Compound Bodies, you may be sure that there is a great Worke wrought in Nature, and a Notable Entrance made into strange Changes of Bodies, and productions: And also a Way made, to doe 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 will call it) which is like the *Wombes* and *Matrices* of liuing creatures, where nothing Expireth, nor Separateth; We will speake fully, in the due place; Not that we Aime at the making of *Paracelsus Pigmey's*; Or any such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall vnder the Conceit of Man; If the force of it be altogether kept in.

Experiment Solitary, touching the *Impossibility of Annihilation.*

There is nothing more Certaine in Nature, than that it is impossible for any *Body*, to be vtterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *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 endeuour and vrge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preseruation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adiacent*, because they are vtterly Heterogeneall; Nor make a *Round* and *Circulation* within themselues; they will neuer change, though they be in their Nature neuer 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 any *King*. And I conceiue the like will be of *Bodies* put into *Quick-siluer*. But then they must be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they haue a greater Crassitude, they will alter in their owne Body, though they spend not. But of this, We shall speake more, when we handle the *Title* of *Conseruation* of *Bodies*. 100

NATV-

NATVRALL HISTORIE.

II. Century.

VSICKE in the *Practise*, hath bin well pursued; And in good Variety; But in the *Theory*, and especially in the *Yeelding* of the *Causes* of the *Practique*, very weakly; Being reduced into certaine Mysticall Subtilties, of no vse, and not much Truth. We shall therefore, after our manner, ioyne the *Contemplatiue* and *Actiue Part* together. Experiments in Consort touching *Musicke*.

All *Sounds*, are either *Musicall Sounds*, which we call *Tones*; Wherunto there may be an *Harmony*; which *Sounds* are euer *Equall*; As *Singing*, the *Sounds of Stringed, and Wind-Instruments*, the *Ringing of Bells*, &c. Or *Immusicall Sounds*; which are euer *Vaequall*; Such as are the *Voice in Speaking*, all *Whisperings*, all *Voices of Beasts, and Birds*, (except they bee *Singing Birds*;) all *Percussions*, of *Stones, Wood, Parchment, Skins* (as in *Drummes*;) and infinite others. 101

The *Sounds* that produce *Tones*, are euer from such *Bodies*, as are in their Parts and Pores *Equall*; As well as the *Sounds* themselues are *Equall*; And such are the *Percussions* of *Metall*, as in *Bells*; Of *Glasse*, as in the Fillipping of a *Drinking Glasse*; Of *Aire*, as in *Mens voices whilest they Sing*, in *Pipes, Whistles, Organs, Stringed Instruments*, &c. And of *Water*; as in the *Nightingale-Pipes* of *Regalls*, or *Organs*, and other *Hydraulickes*; 102

which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man thinke, that the *String* of the *Bowe*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an errour. For the *Sound* is not created between the *Bowe* or *Plectrum*, and the *String*; But between the *String* and the *Aire*; No more then it is between the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that create *Tones*; *Percussions* of *Metalls*, (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussions* of *Water*.

103 The *Diapason* or *Eight* in *Musicke* is the sweetest *Concord*; Insomuch, as it is in effect an *Vnison*; As we see in *Lutes*, that are strung in the Base *Strings* with two strings, one an *Eight* aboue another; Which make but as one *Sound*. And euery *Eighth Note* in Ascent, (as from *Eight* to *Fifteene*: from *Fifteene* to *twenty two*, and so *in infinitum*,) are but *Scales of Diapason*. The *Cause* is darke, and hath not beene rendred by any; And therfore would be better contemplated. It seemeth that Aire, (which is the Subiect of *Sounds*) in *Sounds* that are not *Tones*, (which are all *vnequall*, as hath beene said) admitteth much Varietie; As wee see in the *Voices* of *Liuing Creatures*; And likewise in the *Voices* of seuerall *Men*; (for we are capable to discerne seuerall *Men* by their *Voices*;) And in the *Coniugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the Sounds which we call *Tones*, (that are euer *Equall*) the *Aire* is not able to cast it selfe into any such varietie; But is forced to recurre into one and the same Posture or Figure, onely differing in Greatnesse and Smalnesse. So we see *Figures* may be made of lines, Crooked and Straight, in infinite Varietie, where there is Inequalitie; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of Equall lines) can differ but in Greater, or Lesser.

104 It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number* of *Eight*, to create the *Diapason*), that this Computation of *Eight*, is a thing rather receiued, than any true Computation. For a true Computation ought euer to bee, by Distribution into equall Portions. Now there be interuenient in the *Rise* of *Eight* (in *Tones*) two *Beemolls*, or *Halfe-notes*; So as if you diuide the *Tones* equally, the *Eight* is but *Seuen* whole and equall *Notes*; And if you subdiuide that into *Halfe Notes*, (as it is in the Stops of a *Lute*), it maketh the *Number* of *thirteene*.

105 Yet this is true; That in the ordinary Rises and Falles of the *Voice* of *Man*, (not measuring the *Tone* by whole Notes, and halfe Notes, which is the Equall Measure;) there fall out to be two Beemols (as hath beene said) betweene the *Vnison* and the *Diapason*: And this Varying is naturall. For if a Man would endeuour to raise or fall his *Voice*, still by *Halfe-Notes*, like the Stops of a *Lute*; or by whole *Notes* alone, without *Halfes*; as farre as an *Eight*; he will not be able to frame his *Voice* vnto it. Which sheweth, that after euery three whole *Notes* Nature requireth, for all Harmonicall vse, one *halfe Note* to be interposed.

106 It is to be considered, that whatsoeuer Vertue is in *Numbers*, for

Conducing

Conducing to Concent of *Notes*, is rather to bee ascribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelue*; So that the *Seuenth*, or the *Thirteenth*, is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seuenth* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

The *Concords* in *Musick* which are *Perfect*, or *Semiperfect*, betweene the *Vnison*, 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 doe my selfe and some Other yet, the *Fourth* which they call *Diatessaron*. 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 *Eight* respectiuely from them. 107

For *Discords*, the *Second*, and the *Seuenth*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the One is next aboue the *Vnison*, the Other next vnder the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*. 108

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there be a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are Odious; And therfore the ordinary *Concent* of *Foure Parts* consisteth of an *Eight*, 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 Aire, doth ouercome and drowne the *Treble*, (vnlesse 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 *Mixt Sound*, but onely the *Sound* of the *Base*. 109

We haue no *Musicke* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we see the *Halfe-Notes* themselues doe but interpose sometimes. Neuertheless we haue 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 delightfull. 110

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receiue light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There be two Things Pleasing to the Sight, (leauing *Pictures*, and *Shapes* aside, which are but Secondary Obiects; 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 *Eare*; But the Pleasing of *Order* doth symbolize with *Harmony*. And therfore we see in *Garden-knots*, and the *Frets of Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *vnequall Figures* are but Deformities. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, 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 finde the *Proportion* of that *Correspondence*, is more abstruse; wherof notwithstanding we shall speake somewhat, (when we handle *Tones*,) in the generall Enquiry of *Sounds*. 111

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

113 There be in *Muſick* certaine *Figures*, or *Tropes*; almoſt agreeing with the *Figures* of *Rhetoricke*; And with the *Affections* of the *Minde*, and other *Senſes*. Firſt, the *Diuiſion* and *Quauering*, which pleaſe ſo much in *Muſick*, haue an Agreement with the *Glittering* of *Light*; As the *Moone-Beames* playing vpon a Waue. Againe, the *Falling* from a *Diſcord* to a *Concord*, which maketh great Sweetneſſe in *Muſick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after ſome diſlikes: It agreeth alſo with the *Taſte*, which is ſoone glutted with that which is ſweet alone. The *Sliding from the Cloſe or Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Praeter Expectatum*; For there is a Pleaſure euen in *Being deceiued*. The *Reports*, and *Fugues*, haue an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of Times*, haue an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Meaſure Time*, are in the *Medley* of one *Dance*.

114 It hath been anciently held, and obſerued, that the *Senſe of Hearing*, and the *Kinds of Muſick*, haue moſt Operation vpon *Manners*; As to Incourage Men, and make them warlike; To make them Soft and Effeminate; To make them Graue; To make them Light; To make them Gentle and inclined to Pitty, &c. The *Cauſe* is, for that the *Senſe of Hearing* ſtriketh the *Spirits* more immediatly, than the other *Senſes*; And more incorporeally than the *Smelling*: For the *Sight*, *Taſte*, and *Feeling*, haue their Organs, not of ſo preſent and immediate Acceſſe to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh alſo immediatly vpon the *Spirits*, and is forcible while the Obiect remaineth,) it is with a Communication of the Breath, or Vapour of the *Obiect Odorate*: But *Harmony* entring eaſily, and Mingling not at all, and Comming with a manifeſt Motion; doth by Cuſtome of often Affecting the *Spirits*, and Putting them into one kinde of Poſture, alter not a little the Nature of the *Spirits*, euen when the Obiect is remoued. And therefore we ſee, that *Tunes* and *Aires*, euen in their owne Nature, haue in themſelues ſome Affinity with the *Affections*; As there be *Merry Tunes*, *Doleful Tunes*, *Solemne Tunes*; *Tunes inclining Mens mindes to Pitty*; *Warlike Tunes*; &c. So as it is no Maruell, if they alter the *Spirits*; conſidering that *Tones* haue a Prediſpoſition to the *Motion* of the *Spirits* in themſelues. But yet it hath been noted, that though this variety of *Tunes*, doth diſpoſe the *Spirits* to variety of Paſſions, conforme vnto them; yet generally, *Muſick* feedeth that diſpoſition of the *Spirits* which it findeth. We ſee alſo that ſeuerall *Aires*, and *Tunes*, doe pleaſe ſeuerall *Nations*, and *Perſons*, according to the Sympathy they haue with their *Spirits*.

Perſpective

Perspectiue 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 obserued. It is one of the subtillest Peeces of Nature. And besides, I practise, as I doe aduise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subiect, which is Immateriate, or lesse Materiate; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

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

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heauens* turne about, in a most rapide Motion, without *Noise* to vs perceiued; Though in some *Dreames* they haue 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 Greatnesse of distance from vs, whereby the *Sound* cannot be heard; We see that *Lightnings*, and *Coruscations*, which are neere at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Diuision of the *Aire*. The *Windes* in the *Vpper Region* (which moue the *Clouds* aboue (which we call the *Racke*) and are not perceiued below) passe without *Noise*. The *lower Windes* in a Plaine, except they be strong, make no *Noise*; But amongst Trees, the *Noise* of such *Windes* will be perceiued. And the *Windes* (generally) when they make a *Noise*, doe euer make it vnequally, Rising and Falling, and sometimes (when they are vehement,) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing through the *Aire*, till it fall vpon the Ground, Water, Houses, or the like. *Water* in a *Riuer* (though a swift Streame) is not heard in the Channell, but runneth in Silence, if it be of any depth; But the very *Streame* vpon *Shallowes*, of Grauell, or Pebble, will be heard. And *Waters*, when they beat vpon the Shore, or are straitned, (as in the falls of Bridges;) Or are dashed against themselues, by *Windes*, giue a Roaring *Noise*. Any *peece of Timber*, or *Hard Body*, being thrust forwards by another Body Contiguous, without knocking, giueth no *Noise*. And so *Bodies* in weighing, one vpon another, though the *vpper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though vnobserued;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulsion of the Parts. So it is manifest; That where the Anteriour Body giueth way, as fast as the Posteriour commeth on, it maketh no *Noise*; be the *Motion* neuer so great, or swift. 115

Aire open, and at *large*, maketh no *Noise*, except it be sharply percussed; As in the *Sound* of a String, where *Aire* is percussed by a hard, and 116

and ſtiffe Body; And with a ſharp looſe; For if the String be not ſtrained, it maketh no *Noiſe*. But where the *Aire is pent*, and ſtraithed, there Breath, or other Blowing, (which carry but a gentle Percuſſion,) ſuffice to create *Sound*; As in *Pipes*, and *winde-Inſtruments*. But then you muſt note, that in *Recorders*, which goe with a gentle Breath, the *Concaue* of the *Pipe*, were it not for the *Fipple*, that ſtraitneth the Aire, (much more than the *Simple Concaue*;) would yeeld no *Sound*. For as for other *winde-Inſtruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters-hornes*, &c. Which appeareth by the blowne-cheeks of him that windeth them. *Organs* alſo are blowne with a ſtrong winde, by the Bellowes. And note againe, that ſome kinde of *winde-Inſtruments*, are blowne at a ſmall Hole in the ſide, which ſtraitneth the Breath at the firſt Entrance; The rather, in reſpect of their *Trauerſe*, and *Stop* aboue the Hole, which performeth the *Fipples* Part; As it is ſeene in *Flutes*, and *Fifes*, which will not giue *Sound*, by a Blaſt at the end, as *Recorders*, &c. doe. Likewiſe in all *Whiſtling*, you contract the Mouth; And to make it more ſharp, Men ſometimes vſe their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they giue no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Caſting; Which Hollowneſſe penneth the *Aire*: Nor yet *Arrowes*, except they be ruffled in their Feathers, which likewiſe penneth the *Aire*. As for *Small whiſtles*, or *Shepheards Oaten Pipes*; they giue a *Sound*, becauſe of their extreame Slenderneſſe, whereby the *Aire* is more pent, than in a Wider *Pipe*. Againe, the *Voices* of *Men*, and Liuing Creatures, paſſe through the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a ſharp Percuſſion; And beſides, hath the vantage of penning the *Aire* in the Mouth.

117 *Solide Bodies*, if they be *very ſoftly percuſſed*, giue no *Sound*; As when a man treadeth very ſoftly vpon *Boards*. So *Cheſts* or *Doores* in faire weather, when they open eaſily, giue no *Sound*. And *Cart-wheeles* ſqueak not, when they are liquoured.

118 The *Flame of Tapers*, or *Candles*, though it be a ſwift Motiòn, and breaketh the *Aire*, yet paſſeth without *Sound*. *Aire in Ouens*, though (no doubt) it doth (as it were) boyle, and dilate it ſelfe, and is repercuſſed; yet it is without *Noiſe*.

119 *Flame percuſſed by Aire*, giueth a *Noiſe*; As in Blowing of the Fire by Bellowes; Greater, than if the Bellowes ſhould blow vpon the *Aire* it ſelfe. And ſo likewiſe *Flame percuſſing the Aire ſtrongly*, (as when Flame ſuddenly taketh, and openeth,) giueth a *Noiſe*; So, Great *Flames*, whiles the one impelleth the other, giue a bellowing *Sound*.

120 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 vnpoſſible; For, if the *Aire pent*, be driuen forth, and ſtrike the *Aire 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

it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may be extinguished, or deaded, by discharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more diuided *Sounds*: As if you should make a Crosse Barrell hollow, thorow the Barrell of a Peece, it may be, it would giue seuerall Sounds, both at the Nose, and at the Sides. But I conceiue, that if it were possible, to bring to passe, that there should be no *Aire* pent at the Mouth of the Peece, the Bullet might fly with Inuali, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* vpon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh vpon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made by taking some small *Concaue* of *Metall*, no more than you mean to fill with Powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to haue killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning-Glasse*, when shee walked in *Saint Iames* Parke, 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 talke generally of *Burning-Glasses*, that are able to burne a *Nauy*,) the *Percussion* of the *Aire* alone, by such a *Burning-Glasse*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings*, without *Thunders*. 121

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conueighed to the *Sense*; As well as the *Impression* of *Species visible*: Or else they will not be heard. And therefore, as the Bullet *moueth* so *swift*, that it is *Inuisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For we see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*. 122

All *Eruptions* of *Aire*, though small and slight, giue an *Entity of Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-salt*, and *Bayleaues*, cast into the Fire; So in *Chesnuts*, when they leape forth of the Ashes; So in *Greene Wood* laid vpon the Fire, especially *Roots*; So in *Candles* that spit Flame, if they be wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose-leafe* gathered together into the fashion of a Purse, and broken vpon the Fore-head, or Backe of the Hand, as Children vse. 123

The *Cause* giuen of *Sound*, that it should be an *Elision* of the *Aire* (wherby, if they meane any thing, they meane a *Cutting*, or *Diuiding*, or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit vpon a few Instances; As the Manner is in the *Philosophy* Receiued. And it is common with Men, that if they haue

Experiments in Cõsort touching *Procuction*, *conseruation*, and *Delation of Sounds*; And

the *Office* of the *Aire* therein.

124 haue 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 to be falſe, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, ſome time, after the *Percuſſion*; But ceaſeth ſtraight-waies, if the *Bell*, or *String*, be touched and ſtayed: whereas, if it were the *Eliſion* of the *Aire*, that made the *Sound*, it could not be, that the Touch of the *Bell*, or *String*, ſhould extinguiſh ſo ſuddenly that Motion, cauſed by the *Eliſion* of the *Aire*. This appeareth yet more manifeſtly, by *Chiming* with a Hammer, vpon the Out-ſide of a *Bell*; For the *Sound* will be according to the inward Concaue of the *Bell*; whereas the *Eliſion*, or *Attenuation* of the *Aire*, cannot be but onely betweene the *Hammer*, and the Out-ſide of the *Bell*. So againe, if it were an *Eliſion*, a broad *Hammer*, and a *Bodkin*, ſtrucke vpon Metall, would giue a diuers *Tone*; As well as a diuers *Loudneſſe*: But they doe not ſo; For though the *Sound* of the one be *Louder*, and of the other *Soſter*, yet the *Tone* is the ſame. Beſides, in *Eccho's*, (wherof ſome are as loud as the *Originall Voice*,) there is no new *Eliſion*; but a *Repercuſſion* onely. But that which conuinceth it moſt of all, is; that *Sounds* are generated, where there is no *Aire* at all. But theſe and the like Conceits, when Men haue cleared their vnderſtanding, by the light of Experience, will ſcatter, and breake vp like a Miſt.

125 It is certaine, that *Sound* is not produced at the firſt, but with ſome *Locall Motion* of the *Aire*, or *Flame*, or ſome other *Medium*; Nor yet without ſome *Reſiſtance*, either in the *Aire*, or the *Body Percuſſed*. For if there be a meere Yeelding, or Ceſſion, it produceth no *Sound*; As hath beene ſaid. And therin *Sounds* differ from *Light*, and Colours; which paſſe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the firſt, or after. But you muſt attentiuely diſtinguiſh, betweene the *Locall Motion* of the Aire, (which is but *Vehiculum Cauſſæ*, *A Carrier of the Sounds*,) and the *Sounds* themſelues, Conueighed in the *Aire*. For as to the former, we ſee manifeſtly, that no *Sound* is produced (no not by *Aire* it ſelfe againſt other *Aire*, as in *Organs*, &c.) but with a perceptible *Blaſt* of the *Aire*; And with ſome *Reſiſtance* of the *Aire* ſtrucken. For euen all *Speech*, (which is one of the gentleſt *Motions* of *Aire*,) is with *Expulſion* of a little *Breath*. And all *Pipes* haue 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 doe 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 vtterly without any *Locall Motion* of the *Aire*, Perceptible; And in that reſembleth the *Species viſible*: For after a *Man* hath lured, or a *Bell* is rung, we cannot diſcerne any *Perceptible Motion* (at all) in the *Aire*, a long as the *Sound* goeth; but only at the firſt. Neither doth the *Wind* (as far as it carrieth a *Voice*,) with the *Motion* therof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Variety of Words. And if a *Man* ſpeake a good loudneſſe, againſt the

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 moue the *Candle* far more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it parallelleth in so many other things with the *Sight*, and *Radiation* of *Things visible*; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

Neuertheless it is true, that vpon the *Noise* of *Thunder*, and great *Ordnance*; Glasse windowes will shake; and Fishes are thought to be fraied with the Motion, caused by *Noise* vpon the water. But these Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound*, (as hath beene said;) and not from the *Sound*. 126

It hath beene anciently reported, and is still receiued, that *Extreme Applauses*, and *Shouting of People* assembled in great Multitudes, haue so rarified, and broken the Aire, that *Birds* flying ouer, haue fallen downe, the Aire being not able to support them. And it is beleeued by some, that *Great Ringing of Bells* in populous Cities, hath chased away *Thunder*: and also dissipated Pestilent Aire: All which may be also from the Concussion of the Aire, and not from the *Sound*. 127

A very great *Sound*, neare hand, hath strucken many *Deafe*; And at the Instant they haue found, as it were, the breaking of a Skin or Parchment in their Eare: And my Selfe standing neare one that *Lured* loud, and shrill, had suddenly an Offence, as if somewhat had broken, or beene dislocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary Singing, or Hissing, but far louder, and differing;) so as I feared some *Deafenesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred vnto the *Sound*: For (as is commonly receiued) an *ouer-potent Obiect* doth destroy the *Sense*; And *spiritual Species*, (both *Visible*, and *Audible*.) will worke vpon the Sensories, though they moue not any other Body. 128

In *Delation of Sounds*, the *Enclosure* of them preseruetth them, and causeth them to be heard further. And wee finde in Roules of Parchment, or Trunckes, the Mouth being laid to the one end of the Rowle of Parchment, or Trunckes, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such Concaues it is conserued, and contracted. So also in a Peece of Ordnance, if you speak in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* passeth, and is farre better heard, than in the *Open Aire*. 129

It is further to be considered, how it proueth and worketh, when the *Sound* is not enclosed all the Length of his Way, but passeth partly through open Aire; As where you *speake* some distance from a *Truncke*; or where the *Eare* is some distance from the *Truncke*, at the other End; Or where both *Mouth* and *Eare* are distant from the *Truncke*. And 130

it is tried, that in a long *Truncke*, of ſome eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Truncke*; And ſomewhat more holpen, when the *Eare* of the *Hearer* is neare, than when the *Mouth* of the *Speaker*. And it is certaine, 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*, preſerueth the *Sound*; So doth a *Semi-Concaue*, though in a leſſe degree. And therefore, if you diuide a *Truncke*, or a *Cane* into two, and one ſpeake at the one end, and you lay your Eare at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concaue*; but if you doe the like vpon the *Maſt* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one ſpeake vpon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, than in the Aire at large.

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

133 It is certaine, (howſoeuer it croſſe the Receiued Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the moſt fauourable *Deferent* of *Sounds*. Take a *Veſſell* of *Water*, and knap a paire of Tongs ſome depth within the Water, and you ſhall heare the *Sound* of the Tongs well, and not much diminiſhed; And yet there is no *Aire* at all preſent.

134 Take one *Veſſell of Siluer*, 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 Bottome, and you ſhall finde the *Sound* much more Reſounding from the *Veſſell* of *Siluer*, than from that of *Wood*: And yet if there be no water in the *Veſſell*, ſo that you knap the Tongs in the *Aire*, you ſhall finde no difference, betweene the *Siluer* and *Woodden Veſſell*. Whereby, beſide the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Veſſell*: The other, that ſuch a Communication paſſeth farre better, thorow *Water*, than *Aire*.

135 Strike any *Hard Bodies* together, in the Middeſt of a *Flame*, and you ſhall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

136 The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath ſome Affinity with the *Aire*, performeth, in ſome degree, the Parts of the *Aire*; As when you knocke vpon an *Emptie Barrell*, the *Sound* is (in part) created by the Aire on the Out-ſide; And (in part) by the *Aire* in the Inſide; For the *Sound* will be greater or leſſer, as the Barrell is more Emptie, or more full; But yet the *Sound* participateth alſo with the *Spirit* in the *Wood*, thorow which it paſſeth, from the Outſide to the Inſide: And ſo it commeth to paſſe, in the *Chiming* of *Bells*, on the Outſide; where alſo the *Sound* paſſeth to the Inſide: And a number of other

ther like Instances, whereof we shall speake more, when we handle the *Communication* of *Sounds*.

It were extreame Grossenesse to thinke, (as wee haue partly touched before,) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motûs*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first *Motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the Touch, to his former Place: which *Motion* of *Result* is quicke and sharpe; 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 *Truncke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it selfe in round; And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to goe all into a Canale; It must needs giue greater force to the *Sound*. And so you may note, that *Enclosures* doe not onely preserue *Sound*, but also Encrease and Sharpen it. Experiments in Cõsort touching the *Magnitude*, and *Exility*, and *Damps* of *Sounds*. 138

A *Hunters Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause is*, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards hauing more Roome to spread at the greater End; doe dilate themselues; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And euen *Hunters Hornes*, which are sometimes made straight, and not Oblique, are euer greater at the lower end. It would 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 Concaue againe. 139

There is in *Saint Iames Fields*, a *Conduit* of *Bricke*, vnto which ioyneth a *low Vault*; And at the End of that, a *Round House* of Stone: And in the *Bricke Conduit* there is a Window; And in the *Round House* a Slit or Rift of some little breadth: If you crie out in the Rift, it will make a fearfull Roaring at the Window. The *Cause* is the same with the former; For that all *Concaues*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out. 140

Hawkes Bells, that haue Holes in the Sides, giue a greater Ring, than if the Pellet did strike vpon Brasse, in the *Open Aire*. The Cause is the same with the first *Instance* of the *Truncke*; Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* vnspent, and more strong. 141

In *Drums*, the Closenesse round about, that preserueth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, *farre* more loud, and strong, than if you should strike vpon the like *Skin*, ex- 142

tended in the Open Aire. The *Cause* is the same with the two precedent.

143 *Sounds* are better heard, and further off, in an *Euening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cause* is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thicke, (as in the *Night*) the *Sound* spendeth and spreadeth abroad lesse: 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 speake hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly vpon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musicke* vpon the water soundeth more; And so likewise *Musicke* is better in Chambers Wainscotted, than Hanged.

145 The *Strings* of a Lute, or Violl, or Virginalls, doe giue a far greater *Sound*, by reason of the *Knot*, and *Board*, and *Concaue* vnderneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Vpper Aire into the Lower. The *Cause* is, the Communication of the Vpper Aire with the Lower; And Penning of both from Expence, or Dispersing.

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

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

148 There is a *Church* at *Glocester*, (and as I haue heard the like is in some other places;) where if you speake against a Wall, softly, another shall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the Frame of that Place. I suppose there is some Vault, or Hollow, or Isle, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speake; So as the *Voice*, of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the *Aire* of the Hollow; For it is preserued somewhat by the plaine wall; but that is too weake to giue a *Sound* Audible, till it hath communicated with the backe *Aire*.

149 Strike vpon a *Bowstring*, and lay the *Horne* of the *Bow* neare your Eare, 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,

cussed, before the Aire disperseth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse betweene those two Parts; As appeareth by this; That a Harsh *Grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put vpon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike vpon the other, it maketh a far greater *Sound*, than the like Stroke vpon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that haue beene partly touched, it should appeare; That *Sounds* doe not onely slide vpon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body. 150

I remember in *Trinity Colledge* in *Cambridge*, there was an *Vpper Chamber*, which being thought weake in the Roofe of it, was supported by a Pillar of Iron, of the bignesse of ones Arme, in the middest of the *Chamber*; Which if you had strucke, it would make a little flat Noise in the *Roome* where it was strucke; But it would make a great Bombe in the *Chamber* beneath. 151

The *Sound* which is made by *Buckets* in a *Well*, when they touch vpon the *Water*; Or when they strike vpon 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 Aire*. The *Cause* is, the Penning and Enclosure of the Aire, in the Concaue of the *Well*. 152

Barrells placed in a Roome vnder the Floare of a *Chamber*, make all *Noises* in the same Chamber, more Full and Resounding. 153

So that there be fine ways (in generall,) of Maioration of Sounds: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; *and* Approach *to the* Sensory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solide* 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 Aire. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weaknesse*, 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 *Aëtites*, or *Eagles* Stone, which hath a little Stone within it. 154

And as for *Water*, it is a certaine Triall: Let a Man goe into a *Bath*, and take a *Paile*, and turne the Bottome vpward, and carry the Mouth of it, (Euen,) downe to the Leuell of the *Water*; and so presse it downe vnder the *Water*, some handfull and an halfe, still keeping it euen, that it may not tilt on either side, & so the Aire get out: Then let him that is in the *Bath*, diue with his Head so far vnder *Water*, as he may put his Head into the *Paile*; & there wil come as much *Aire* bubling forth, as wil make Roome 155

Roome for his Head. Then let him ſpeak; and any that ſhal ſtand without, ſhal heare his *Voice* plainly; but yet made extreme ſharp and exile, like the *Voice* of *Puppets*: But yet the *Articulate Sounds* of the *Words* will not be cõfounded. Note that it may be much more handſomely done, if the *Paile* be put ouer the Mans head aboue Water, and then he cowre downe, and the *Paile* be preſſed downe with him. Note that a Man muſt kneele or ſit, that he may be lower than the *Water*. A Man would thinke, that the *Sicilian Poet* had knowledge of this *Experiment*; For he ſaith; That *Hercules Page Hylas* went with a Water-pot, to fill it at a pleaſant *Fountaine*, that was neere the Shore, and that the *Nymphs* of the *Fountaine* fell in loue with the Boy, and pulled him vnder *Water*, keeping him aliue; 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 beene three miles off, when the *Fountaine* (indeed) was faſt by.

156 In *Lutes*, and *Inſtruments* of *Strings*, if you ſtop a *String* high, (whereby it hath leſſe 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 Bottome of the other, within a *Paile* of *Water*; And you ſhall finde, that as you put the Sawcers lower, and lower, the Sound groweth more flat; euen while Part of the *Sawcer* is aboue the Water; But that Flatneſſe of *Sound* is ioyned with a Harſhneſſe of *Sound*; which (no doubt) is cauſed by the Inequalitie of the *Sound*, which commeth from the Part of the *Sawcer* vnder the *Water*, and from the Part aboue. But when the *Sawcer* is wholly vnder the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*; As if a Bell hath Cloth, or Silke 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 vſe to line the Tablemen.

159 Triall was made in a *Recorder*, after theſe ſeuerall manners. The Bottome of it was ſet againſt the Palme of the Hand; ſtopped with Wax round about; ſet againſt a Damaske Cuſhion; Thruſt into Sand; Into Aſhes; Into Water, (halfe an Inch vnder the Water;) Cloſe to the Bottome of a Siluer Baſin; And ſtill the *Tone* remained: But the Bottome of it was ſet againſt a Woollen Carpet; A Lining of Pluſh; A Locke 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 leſſe Reſounding. So likewiſe *Warme Water*, when it falleth, maketh not ſo full a *Sound*, as *Cold*: And I conceiue it is ſofter, and neerer the Nature of Oyle; For it is more ſlippery; As may be perceiued, in that it ſcowreth better.

161 Let there be a *Recorder* made, with two Fipples, at each end one; The *Trunke*

Trunckes of it of the length of two *Recorders*, and the Holes answerable toward each end; And let two play the same Lesson vpon it, at an Vnison; And let it be noted, whether the *Sound* be consounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two Truncke (thorow-out) hollow; And let two speake, or sing, the one long-waies, the other trauerse: And let two heare at the opposite Ends; And note, whether the *Sound* be consounded; amplified; or dulled. Which two *Instances* will also giue light to the *Mixture* of *Sounds*; wherof we shall speake hereafter.

A *Bellowes* blowne in at the *Hole* of a *Drum*, and the *Drum* then strucken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the Aire, being blowne together, lesse moueable. 162

The *Loudnesse*, and *Sostnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exility* of *Sounds*; For a *Base String*, though softly strucken, giueth the greater *Sound*; But a *Treble String*, if hard strucken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more Aire; And the *Treble* lesse Aire, but with a sharper Percussion. Experiments in Consort touching the *Loudnesse* or *Sosnesse* of *Sounds*; and their *Carriage at longer or shorter Distance*.

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Sostnesse* of *Sounds*: As in knocking harder or softer; 163
Winding of a Horne stronger or weaker; Ringing of a Hand-bell harder or softer, &c. And the *Strength* of this *Percussion*, consisteth, as much, 164
or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a Cloth, it will giue a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metals, if you strike against Gold, (which is the more pliant,) it giueth the flatter *Sound*; If against Siluer, or Brasse, the more Ringing *Sound*. As for *Aire*, 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 *Loudnesse* of the Report.

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *Strength*: As in a Whip, or Wand, if you strike the Aire with it; the Sharper and Quicker you strike it, the *Louder Sound* it giueth. And in playing vpon the *Lute*, or *Virginalls*, the quicke Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the Aire speedily; whereas the Soft Striking doth rather beat, than cut. 165

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Empty Vessells, *&c.*) hath beene touched obiter, in the *Maioration* of *Sounds*: But it is fit also to make a *Title* of it apart. Experiments in Consort touching the *Communication* of *Sounds*.

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166 The *Experiment* for greateſt Demonſtration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you ſtrike with a Hammer vpon the Vpper Part, and then vpon the Midſt, and then vpon the Lower, you ſhall finde the *Sound* to be more Treble, and more Baſe, according vnto the Concaue, on the Inſide; though the Percuſſion be onely on the Outſide.

167 When the *Sound* is created betweene the *Blaſt* of the *Mouth*, and the *Aire* of the *Pipe*, it hath neuertheleſſe 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 Braſſe, the *Sound* will be diuers; So if the *Pipe* be couered with *Cloth*, or *Silke*, it will giue a diuers *Sound*, from that it would doe of it ſelfe; So, if the *Pipe* be a *little wet* on the *Inſide*, it will make a differing *Sound*, from the ſame *Pipe dry*.

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

Experiments in Cõſort touching *Equality*, and *Inequality* of *Sounds*.

We haue ſpoken before (in the *Inquiſition* touching *Muſicke*,) of *Muſicall Sounds*, wherunto there may be a Concord or Diſcord in two Parts; Which *Sounds* we call *Tones*: And likewiſe of *Immuſicall Sounds*; And haue giuen the *Cauſe*, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And we haue alſo expreſſed there, what are the *Equall Bodies* that giue *Tones*, and what are the *Vnequall* that giue none. But now we ſhall ſpeake of ſuch *Inequality* of *Sounds*, as proceedeth, not from the Nature of the Bodies themſelues, but is Accidentall; Either from the *Roughneſſe*, or *Obliquity* of the *Paſſage*; Or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it haue a *Rift* in it, whereby the *Sound* hath not a cleare Paſſage, giueth a *Hoarſe* and *Iarring Sound*; So the *Voice* of *Man*, when by Cold taken the Weſill groweth rugged, and (as we call it) furred, becommeth hoarſe. And in theſe two *Inſtances*, the *Sounds* are Ingrate; becauſe they are meerely *Vnequall*: But, if they be *Vnequall* in *Equality*, then the *Sound* is Gratefull, but Purling.

170 All *Inſtruments*, that haue either *Returnes*, as Trumpets; Or *Flexions*, as Cornets; Or are *Drawne vp*, and *put from*, as Sackbuts; haue a *Purling Sound*: But the *Recorder*, or *Flute*, that haue none of theſe *Inequalities*, giue a cleare *Sound*. Neuertheleſſe, the *Recorder* it ſelfe, or *Pipe* moiſtened a little in the Inſide, ſoundeth more ſolemnly, and with a little Purling, or Hiſſing. Againe, a *Wreathed String*, ſuch as are in the Baſe Strings of *Bandoraes*, giueth alſo a *Purling Sound*.

171 But a *Lute-ſtring*, if it be meerely *Vnequall* in his Parts, giueth a Harſh and

and Vntuneable *Sound*; which *Strings* we call *False*, being bigger in one Place than in another; And therefore *Wire-strings* are neuer *False*. We see also, that when we try a *False Lute-string*, wee vse to extend it hard betweene the fingers, and to fillip it; And if it giueth a double *Spectes*, it is *True*; But if it giueth a treble, or more, it is *False*.

Waters, in the *Noise* they make as they runne, represent to the Eare a *Trembling Noise*; And in *Regalls*, (where they haue a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling: And Children haue also little Things they call *Cockes*, which haue *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. 172

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

We know Nothing, that can at pleasure make a *Musicall*, or *Immusicall Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The *Cause* is, (no doubt) in the Weaitll or Wind-pipe, (which we call *Aspera Arteria*,) which being well extended gathereth *Equality*; As a Bladder that is wrinckled, if it be extended, becommeth smooth. The Extension is alwaies more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can neuer a giue *Tone*: And in *Singing*, there is (manifestly) a greater Working and Labour of the Throat, than in *Speaking*; As appeareth in the Thrusting out, or Drawing in of the Chinne, when we sing. 174

The *Humming* of *Bees*, is an *Vnequall Buzzing*; And is conceiued, 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. 175

All *Metalls quenched* in *Water*, giue a Sibilation or Hissing Sound; (which hath an Affinity with the letter Z.) notwithstanding the *Sound* be created betweene the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small Store of *Water*, in a Vessell, giueth a Hissing *Sound*; But *Boyling* in a full Vessell giueth a Bubling *Sound*, drawing somewhat neare to the *Cocks* vsed by Children. 176

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 Aire 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 *Brasse*, and a *Plancke* of *Wood*, and ioyne them close together, and knock vpon one of them, and see if they doe not giue an *vnequall Sound*. So make two or three *Partitions* of *Wood* in a *Hogshead* with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *Partitions*. 177

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

It is euident, that the *Percuſſion* of the *Greater Quantity of Aire*, cauſeth the *Baſer Sound*; And the leſſe *Quantity*, the more *Treble Sound*. The *Percuſſion* of the *Greater Quantity of Aire*, is produced by the *Greatneſſe of the Body Percuſſing*; By the *Latitude* of the *Concaue*, by which the *Sound* paſſeth; and by the *Longitude* of the ſame *Concaue*. Therfore we ſee that a *Baſe ſtring*, is greater than a *Treble*; A *Baſe Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Baſe Sound* they yeeld; And the nearer the Mouth, the more *Treble*. Nay more, if you ſtrike an *Entire Body*, as an *Andiron* of *Braſſe*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baſer*.

178

179 It is alſo euident, that the *Sharper* or *Quicker Percuſſion of Aire* cauſeth the more *Treble Sound*; And the *Slower* or *Heauier*, the more *Baſe Sound*. So we ſee in *Strings*; the more they are wound vp, and ſtrained; (And thereby giue a more quicke Start-backe;) the more *Treble* is the *Sound*; And the ſlacker they are, or leſſe wound vp, the *Baſer* is the *Sound*. And therfore a Bigger *String* more ſtrained, and a Leſſer *String*, leſſe ſtrained, may fall into the ſame *Tone*.

180 *Children*, *Women*, *Eunuchs* haue more ſmall and ſhrill *Voices*, than *Men*. The Reaſon is, not for that *Men* haue greater Heat, which may make the *Voice* ſtronger, (for the ſtrength of a *Voice* or *Sound*, doth make a difference in the *Loudneſſe* or *Softneſſe*, 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 drawne downe to the Spermaticall veſſells; it leaueth the Body more hot than it was; whence commeth the Dilatation of the Pipes: For we ſee plainly, all Effects of Heat, doe then come on; As Piloſity, more Roughneſſe of the Skinne, Hardneſſe of the Fleſh, &c.

181 The Iuduſtry of the *Muſitian*, hath produced two other Meanes of *Strayning*, or *Intenſion* of *Strings*, beſides their *Winding vp*. The one is the *Stopping* of the *String* with the *Finger*; As in the Necks of Lutes, Viols, &c. The other is the *Shortneſſe* of the *String*; As in Harps, Virginalls, &c. Both theſe haue one, and the ſame reaſon; For they cauſe the *String* to giue a quicker Start.

182 In the *Straining* of a *String*, the further it is ſtrained, the leſſe *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 goe, the leſſe Diſtance is betweene the Frets.

183 If you fill a *Drinking-Glaſſe* with *Water*, (eſpecially one Sharp below, and Wide aboue,) and fillip vpon the Brim, or Outſide; And after empty Part of the *Water*, and ſo more and more, and ſtill try the *Tone* by Fillipping; you ſhall finde the *Tone* fall, and be more *Baſe*, as the *Glaſſe* is more Empty.

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The Iust and Measured *Proportion* of the *Aire Percussed*, towards the *Basenesse* or *Treblenesse* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discoueretb the true *Coincidence* of *Tones* into *Diapasons*; Which is the Returne of the same *Sound*. And so of the *Concords* and *Discords*, betweene the *Vnison*, and *Diapason*; Which we haue touched before, in the *Experiments* of *Musicke*; but thinke 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 *Concaue* of *Pipes*, &c. But most commodiously in the last of these. Experiments in Consort touching the *Proportion* of *Treble* and *Base Tones*.

Try therfore the *Winding* of a *String* once about, as soone as it is brought to that Extension as will giue a *Tone*; And then of twice about; And thrice about, &c. And marke the Scale or Difference of the Rise of the *Tone*: Wherby you shall discouer, 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 lesse strained. But note that to measure this, the way will be, to take the Length in a right Line of the *String*, vpon any Winding about of the Pegge. 184

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*, vnto such a Stop as shall produce a *Diapason* to the former Stop, vpon the same *String*. 185

But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*: And therfore cause some halfe 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 marke what Fall of *Tone* euery one giueth. But still in these three last *Instances*, you must diligently obserue, what *length* of *String*, or *Distance* of *Stop*, or *Concaue* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giueth the aptest demonstration,) you must set downe what Encrease of *Concaue* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so vp to the *Diapason*: For then the great Secret of *Numbers*, and *Proportions*, will appeare. It is not vnlike, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-founders* in fitting the tune of their *Bells*. So that Enquiry may saue Triall. Surely, it hath beene obserued by one of the *Ancients*, that in *Empty Barrell* knocked vpon with the finger, giueth a *Diapason* to the *Sound* of the like *Barrell full*; But how that should be, I doe not well vnderstand; For that the knocking of a *Barrell full*, or *Empty*, doth scarce giue any *Tone*. 186

187 There is required ſome ſenſible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it ſelfe, which is the Paſſiue: And that it be not too neare, but at a diſtance. For in a *Recorder*, the three vppermoſt 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*.

Experiments in Conſort touching *Exteriour*, and *Interiour Sounds*.

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 *Muſicall*, nor *Immuſicall*: 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 *Muſicall* and *Immuſicall*. We ſhall therfore enumerate them, rather than preciſely diſtinguiſh them; Though (to make ſome Adumbration of that we meane) 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*.

188 In *Speech* of *Man*, the *Whiſpering*, (which they call *Suſurrus* in *Latine*,) whether it be louder or ſoftet, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therfore you can neuer make a *Tone*, nor ſing in *Whiſpering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *Wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concaue*, (though ſoft) is an *Exteriour*. So likewiſe, the greateſt *Winds*, if they haue no Coarctation, or blow not hollow, giue an *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 owne Denſity: And therfore we ſee, that when the *Wind* bloweth hollow, it is a Signe of Raine. The *Flame*, as it moueth within it ſelfe, or is blowne by a *Bellowes*, giueth a Murmur or *Interiour Sound*.

189 There is no *Hard Body*, but ſtrucke againſt another *Hard Body*, will yeeld an *Exteriour Sound*, greater or leſſer: In ſo much as if the Percuſſion be ouer-ſoft, it may induce a Nullity of *Sound*; But neuer an *Interiour Sound*; As when one treadeth ſo ſoftly, that he is not heard.

190 Where the *Aire* is the *Percutient*, pent, or not pent, againſt a *Hard Body*, it neuer giueth an *Exteriour Sound*; As if you blow ſtrongly with a Bellowes againſt a Wall.

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

Experiments in Conſort, touching *Articulation of Sounds*.

It is euident, and it is one of the ſtrangeſt Secrets in *Sounds*, that the *whole Sound* is not in the *whole Aire* onely; But the *whole Sound* is alſo in euery ſmall *Part* of the *Aire*. So that all the curious Diuerſity of *Arti-*

192 *culate*

culate Sounds, of the Voice of Man, or Birds, will enter at a small Cranny, Inconfused.

The *Vnequall Agitation* of the *Winds*, and the like, though they bee material to the Carriage of the *Sounds*, further, or lesse way; yet they doe 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 lesse Way, than in a Still; as hath beene partly touched. 193

Ouer-great Distance confoundeth the *Articulation* of *Sounds*; As we see, that you may heare 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 speake at once. 194

In the *Experiment* of *Speaking vnder Water*, when the Voice is reduced to such an Extreme Exility, yet the *Articulate Sounds*, (which are the *Words*,) are not confounded; as hath beene said. 195

I conceiue, 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 Cranny; yet the first *Articulation* requireth more Dimension. 196

It hath beene obserued, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewise in the Roote, 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 therfore the *Articulate Sounds* are more confused, though the Grosse of the *Sound* be greater. 197

The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the seuerall *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 ouer, and place them amongst the *Experiments* of *Speech*. The *Hebrewes* haue beene diligent in it, and haue assigned, which *Letters* are *Labiall*, which *Dentall*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they haue distinguished betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Mutæ Tenues*, *Mediæ*, and *Asperatæ*; Not amisse; But yet not diligently enough. For the speciall *Strokes*, & *Motions*, that create those *Sounds*, they haue 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 turne into *M.* As *Hecatonba*, will be *Hecatomba*. That *M.* and *T.* cannot be pronounced together, but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the Making of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*. 198

The *Lungs* are the most Spongy Part of the Body; And therefore ablest to contract, and dilate it selfe: And where it contracteth it selfe, it 199

it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Palate*, and the reſt of thoſe they call *Inſtruments* of *voice*.

200 There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that haue no *Voice Articulate*; and diuers *Letters* of *Articulate Voices*: And commonly Men haue giuen ſuch Names to thoſe *Sounds*, as doe allude vnto the Articulate Letters. As *Trembling* of *Water* hath Reſemblance with the *Letter L*; *Quenching* of *Hot Mettalls*, with the *Letter Z*; *Snarling* of *Dogs*, with the *Letter R*; The *Noiſe of Scritchowles*, with the *Letter Sh*; *Voice* of *Cats*, with the *Dypthong Eu*; *Voice* of *Cuckoes*, with the *Dypthong Ou*; *Sounds* of *Strings*, with the *Letter Ng*: So that if a Man, (for Curioſity, or Strangeneſſe 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 *Voice*; 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.

NATV-

NATVRALL HISTORIE.

III. Century.

ALL *Sounds* (whatſoeuer) moue Round; That is to ſay; On *all Sides*; *Vpwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Inſtances*. 201 Experiments in Conſort, touching the *Motions* of *Sounds*, in what *Lines* they are *Circular*, *Oblique*, *Straight*; *Vpwards*, *downwards*; *Forwards*, *Backwards*.

Sounds doe not require to bee conueyed to the *Senſe*, in a *Right Line*, as *Viſibles* doe, but may be *Arched*; Though it be true, they moue ſtrongeſt in a *Right Line*; Which neuertheleſſe is not cauſed by the *Rightneſſe* of the *Line*, but by the Shortneſſe of the diſtance; *Linea recta breuiſſima*. And therefore we ſee, if a *Wall* be betweene, and you ſpeake on the one Side, you heare it on the other; Which is not becauſe the *Sound* P ſſ th thorow the *Wall*; but *Archeth* ouer the *Wall*. 202

If the *Sound* be *Stopped* and *Repercuſſed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one ſide of the Boot be downe, and the other vp; And a Begger beg on the Cloſe Side; you would thinke that he were on the Open Side. So likewiſe, if a *Bell* or *Clocke*, be (for Example) on the North-ſide of a Chamber; And the Window of that Chamber be vpon the South; He that is in the Chamber, will thinke the *Sound* came from the South. 203

Sounds, though they *ſpread round*, (ſo that there is an *Orbe*, or *Spherical Area* of the *Sound*;) yet they moue ſtrongeſt, and goe furtheſt in the *Fore-lines*, from the firſt Locall Impulſion of the Aire. And therefore in *Preaching*, you ſhall heare the *Preachers* Voice, better, before the Pulpit, than behinde it, or on the Sides, though it ſtand open. So a *Harquebuz*, or *Ordnance*, will be further heard, forwards, from the Mouth of the *Peece*, than backwards, or on the Sides. 204

It may bee doubted, that *Sounds* doe moue better, Downwards than 205

than Vpwards. *Pulpits* are placed high aboue the People. And when the Ancient *Generalls* spake to their Armies, they had euer a Mount of Turfe cast vp, whereupon they stood: But this may be imputed to the Stops and Obstacles, which the voice meeteth with, when one speaketh vpon the leuell. But there seemeth to be more in it: For it may bee, that *Spirituall Species*, both of *Things Visible* and *Sounds*, doe moue better *Downewards* than *Vpwards*. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pauls, seeme much lesse then they are, and cannot bee knowne; But to Men aboue, those below seeme nothing so much lessened, and may bee knowne: yet it is true, that all things to them aboue, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Vpper window, or Tarras.

206 But to make an exact Triall of it, let a Man stand in a *Chamber*, not much aboue the Ground, and speake out at the window, through a *Trunke*, to one standing on the Ground, as softly as he can, the other laying his Eare close to the *Trunke*: Then *viâ versa*, let the other speake *below* keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Trunck*: And this may be the aptest Meanes, to make a Iudgement, whether *Sounds* descend, or ascend, better.

Experiments in Consort touching the Lasting and Perishing of *Sounds*; and touching the Time they require to their Generation, or Delation.

207 After that *Sound* is created, (which is in a moment,) wee finde it continueth some small time, melting by little and little. In this there is a wondersull Errour amongst Men, who take this to be a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renouation*, 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 *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String strucken, which is thought to be a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a Virginall, as soone as euer the Iacke falleth, and toucheth the String, the Sound ceaseth; And in a Bell, after you haue chimed vpon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish, that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is Pensile: The other Secret, of the Minute Parts; such as is described in the 9th Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde 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 haue plaied; But that is but while the Bellowes are in Falling.

208 It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will be carried, (at the least) twenty Miles vpon the land, and much further vpon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the *First Sound*; For there is no *Trepidation* which should renew it. And the

the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more than Momentany.

To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and haue with him a Taper; And let some Vaile 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 Vaile; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light seene*, and the *Sound heard*: For it is certaine that the *Delation* of Light is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*. 209

It is generally knowne and obserued, that *Light*, and the *Obiect* of *Sight*, moue swifter than *Sound*; For we see the *Flash* of a Peece is seene sooner, than the *Noise* is heard. And in Hewing wood, if one be some distance off, he shall see the Arme lifted vp for a second Stroke, before he heare the Noise of the first. And the greater the Distance, the greater is the Preuention: As we see in Thunder, which is farre off; where the Lightning Precedeth the Cracke a good space. 210

Colours, when they represent themselues to the Eye, fade not, nor melt not by Degrees, but appeare 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 *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *Sinè quâ non*,) in that, it perisheth so suddenly; For in euery Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe; which the *Water* also doth, but nothing so swiftly. 211

In the Trialls 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 passe thorow a small Chincke. Experiments in Consort, touching the *Passage* and *Interceptions* of *Sounds*.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bells stopped; &c.) the *Hard*, or *Close Body*, must be but thinne and small; For else it deadeth and extinguisheth the *Sound* vtterly. And therefore, in the *Experiment* of *Speaking in Aire vnder Water*, the Voice must not be very deepe within the *Water*: For then the *Sound* pierceth not. So if you speake on the further side of a *Close Wall*, if the *Wall* be very thicke, you shall not be heard: And if there were an Hogshead emptie, whereof the Sides were some two Foot thicke, and the Bunghole stopped; I conceiue the Resounding Sound, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none; But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessell were full. 212

213 It is certaine, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are strucke, than when the Percussion is onely within, without Touch of the Sides. Take therfore a Hawkes Bell, the holes stopped vp, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell giue any *Sound* at all, or how weake? But note, that you must in stead of the Threed, take a Wire; Or else let the Glasse haue a great Belly; lest when you shake the Bell, it dash vpon the Sides of the Glasse.

214 It is plaine, that a very *Long*, and *Downe-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard ouer a wall, will not be heard ouer a Church; Nor that *Sound*, which will be heard, if you stand some distance from the wall, will be heard if you stand close vnder the Wall.

215 *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 beene 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 Glasse-windowes, if they be very Close, will checke a *Sound* more, than the like Thicknesse of Cloth. Wee 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 *Weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be,) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps,) not so well.

Experiments in Cõsort touching the *Medium* of *Sounds*.

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

217 In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense;

218 As appeareth in *Night Sounds*; And *Euening Sounds*; And *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the *Title* of *Maioration* of *Sounds*; Being for that *Thinne Aire* is better pierced; but *Thicke Aire* preserueth the *Sound* better from Wast; Let further Triall 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 *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is betweene; But then you must allow, for some disturbance, the *Noise* that the *Flame* it selfe maketh.

220 Whether any other *Liquours*, being made *Mediums*, cause a Diuersity of *Sound* from *Water*, it may be tried: As by the Knapping of the Tongs; Or Striking of the Bottome of a vessell, filled either with Milke, or

or with Oyle ; which though they be more light, yet are they more vn equall Bodies than Aire.

Of the Natures *of the* Mediums, *we haue now ſpoken ; As for the* Diſpoſition *of the ſaid* Mediums, *it doth conſiſt in the Penning, or not Penning of the* Aire ; *Of which we haue ſpoken before, in the* Title *of* Delation *of* Sounds : *It conſiſteth alſo in the* Figure *of the* Concaue, *through which it paſſeth ; Of which we will ſpeake next.*

How the *Figures* of *Pipes*, or *Concaues*, through which *Sounds* paſſe ; Or of other *Bodies deferent* ; conduce to the Varietie and Alteration of the *Sounds*; Either in reſpect of the *Greater Quantitie*, or *leſſe Quantitie* of *Aire*, which the *Concaues* receiue ; Or in reſpect of the *Carrying* of *Sounds* longer or ſhorter way ; Or in reſpect of many other *Circumſtances* ; they haue beene touched, as falling into other *Titles*. But thoſe *Figures*, which we now are to ſpeake of, wee intend to be, as they concerne the *Lines*, through which *Sound* paſſeth; As *Straight ; Crooked ; Angular ; Circular ;* &c.

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

The *Figure* of a *Bell* pertaketh of the *Pyramis*, but yet comming off, and dilating more ſuddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique ; yet they haue likewiſe *Straight Hornes* ; which if they be of the ſame Bore with the *Oblique*, differ little in *Sound* ; Saue that the Straight require ſomewhat a ſtronger Blaſt. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are ſtraight ; But the *Recorder* hath a leſſe Bore, and a greater ; Aboue, and below. The *Trumpet* hath the *Figure* of the *Letter S* : which maketh that Purling *Sound*, &c. Generally, the *Straight Line* hath the cleaneſt and roundeſt *Sound*, And the *Crooked* the more Hoarſe, and Iarring. 221

Of a *Sinuous Pipe*, that may haue ſome foure Flexions, Triall would be made. Likewiſe of a *Pipe*, made like a *Croſſe*, open in the middeſt. And ſo likewiſe of an *Angular Pipe* : And ſee what will be the Effects of theſe ſeuerall *Sounds*. And ſo againe 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 Trauerſe or Stop betweene them ; So that your Breath may goe the Round of the *Circle*, and come forth at the ſecond Hole. You may trie likewiſe *Percuſsions* of *Solide Bodies* of ſeuerall *Figures* ; As *Globes, Flats, Cubes, Croſſes, Triangles*, &c. And their *Combinations* ; As *Flat* againſt *Flat* ; And *Conuex* againſt *Conuex* ; And *Conuex* againſt *Flat*, &c. And marke well the diuerſities of the *Sounds*. Trie alſo the difference in *Sound* of ſeuerall *Craſsitudes* of *Hard Bodies* percuſſed ; And take knowledge of the diuerſities of the *Sounds*. I my ſelfe haue tried, that a *Bell* of *Gold* yeelderh an excellent *Sound*, not inferiour to that of *Siluer*, or *Braſſe*, but rather better : yet wee ſee that a 222

peece of Money of *Gold* soundeth farre more flat than a peece of Money of *Siluer*.

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

Experiments in Consort touching the *Mixture* of *Sounds*.

224 There is an apparent Diuersitie betweene the *Species Visible*, and *Audible*, in this; That the *Visible* doth not *mingle* in the *Medium*, but the *Audible* doth. For if wee looke abroad, wee see Heauen, a number of Stars, Trees, Hills, Men, Beasts, at once. And the *Species* of the one doth not confound the other. But if so many *Sounds* came from seuerall Parts, one of them would vtterly confound the other. So wee see, that *Voices* or *Consorts* of *Musicke* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true neuertheless, that a great *Light* drowneth a smaller, that it cannot be seene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a lesser. And I suppose likewise, that if there were two Lanthornes of Glasse, the one a Crimsin, and the other an Azure, and a Candle within either of them, those Coloured Lights would mingle, and cast vpon a White Paper a Purple Colour. And euen in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make Roomes more lightsome than blacke, &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 seuerall *Cones*; And so there can be no Coincidence in the Eye, or Visuall Point: But *Sounds*, that moue in Oblique and Arcuate Lines, must needs encounter, and disturbe the one the other.

225 The sweetest and best *Harmony* is, when euery *Part*, or *Instrument*, is not heard by it selfe, but a Consilation of them all; Which requireth to stand some distance off. Euen as it is in the *Mixture* of Perfumes; Or the Taking of the Smells of seuerall *Flowers* in the *Aire*.

226 The *Disposition* of the *Aire*, in other *Qualities*, except it be ioyned with *Sound*, hath no great Operation vpon *Sounds*: For whether the *Aire* be lightsome or darke, 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.

227 But *Sounds* doe disturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one Iarring 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 *lowdnesse*, will not be heard, twice as farre, as one of

of them alone; And two *Candles* of like Light, will not make Things seene twice as farre off, as one. The Cause is profound: But it seemeth that the *Impressions* from the *Obiects* of the *Senses*, doe *mingle* respectiuely, euery one with his kinde; But not in proportion, as is before demonstrated: And the reason may be, because the first *Impression*, which is from *Priuatiue* to *Actiue*, (As from *Silence* to *Noise*, or from *Darknesse* to *Light*,) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light*, to *More Light*. And the Reason of that againe may be; For that the *Aire*, after it hath receiued a Charge, doth not receiue 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 selfe.

All *Reflexions Concurrent* doe make *Sounds* Greater; But if the Body that createth, either, the Original *Sound*, or the *Reflexion*, be cleane and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Viol*, with the Belly of polished Brasse, in stead of Wood. We see that euen in the Open Aire, the *Wire String* is sweeter, than the *String* of *Guts*. And we see that for *Reflexion*, *Water* excelleth: As in *Musick* neare the *Water*; Or in *Echo's*. Experiments in Consort touching *Meliuration* of *Sounds*.

229

It hath beene 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) betweene dry and wet, become a little more Euen and Smooth; But the Purling, which must needs proceed of Inequality,) I take to be bred betweene the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the Wood of the *Pipe*, vnto which the Wet commeth not, but it remaineth dry. 230

In *Frosty weather*, *Musicke* within doores soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, 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 doe *Lute-strings* that haue beene kept long. 231

Sound is likewise *Meliorated* by the *Mingling* of *open Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Viol* with a double Belly; Making another Belly with a Knot ouer the Strings; yet so, as there be Roome enough for the Strings, and Roome enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concaue on both Sides; Whereas it vseth to haue it but on one Side. The doubt may be, lest it should make too much Resounding; wherby one Note would ouertake another. 232

If you sing into the Hole of a *Drum*, it maketh the *Singing* more sweet. 233

ſweet. And ſo I conceiue it would, if it were a *Song* in Parts, ſung into ſeuerall *Drums*; And for handſomneſſe and ſtrangeneſſe ſake, it would not be amiſſe to haue a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

234 When a *Sound* is created in a *Wind-Inſtrument*, betweene the *Breath* and the *Aire*, 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 againe in a *Trumpet* or *Pipe* of *Braſſe*. It were good to try *Recorders* and *Hunters Horns* of *Braſſe*, what the *Sound* would be.

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

Experiments in Cõſort touching the *Imitation* of *Sounds*.

It is a Thing ſtrange in Nature, when it is attentiuely conſidered; How *Children*, and ſome *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that ſpeaketh; For

236 *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquiſite: So one would thinke it were a Leſſon hard to learne. It is true, that it is done with time, and by little and little, and with many Eſſayes and Proffers: But all this diſchargeth not the Wonder. It would make a Man thinke (though this which we ſhall ſay may ſeeme exceeding ſtrange) that there is ſome *Tranſmiſſion* of Spirits; and that the *Spirits* of the *Teacher* put in Motion, ſhould worke 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 ſpeake in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a prediſpoſition to *Imitate*. We ſee how ready Apes and Monkies are, to *imitate* all Motions of Man: And in the Catching of Dottrells, 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.

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

238 No *Beaſt* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape it

it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I haue knowne a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the *Speech* of *Man*, may be further enquired. We see that *Beasts* haue those Parts, which they count the *Instruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker vnto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* haue it, for the Length, as much as *Birds*. What better *Gorge*, or Artire, *Birds* haue, may be further enquired. The *Birds* that are knowne to be Speakers, are, *Parrots*, *Pyes*, *Iayes*, *Dawes*, and *Rauens*. Of which *Parrots* haue an adunque Bill, but the rest not.

But I conceiue, that the *Aptnesse* of *Birds*, is not so much in the *Conformitie* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* must come by *Hearing*, and *Learning*; And *Birds* giue more heed, and marke *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, doe keepe them Waking, to increase their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are euer the better *Singers*; which may be, because they are more liuely, and listen more. 239

Labour, and *Intention* to *imitate voices*, doth conduce much to *Imitation*: And therfore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* of *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselues; And so the *Voices* of other *Men* that they heare. 240

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

There be three Kindes of *Reflexions* of *Sounds*, A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, wherof the first hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speake of. Experiments in Consort, touching the *Reflexion* of *Sounds*.

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

The *Naturall Eccho's* are made vpon *Walls*, *Woods*, *Rockes*, *Hills*, and *Banckes*; As for *Waters*, being neare, they make a *Concurrent Eccho*; But 243

beiug

being further off, (as vpon a large *Riuer*) they make an *Iterant Eccho*: For there is no difference betweene the *Concurrent Eccho*, and the *Iterant*, but the Quicknesse, or Slownesse of the Returne. But there is no doubt, but *Water* doth helpe the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certaine, (as hath beene formerly touched,) that if you speake thorow a *Truncke*, stopped at the further end, you shall finde a Blast returne vpon your Mouth, but no *Sound* at all. The *Cause* is, for that the *Closenesse*, which preserueth the *Original*, is not able to preserue the *Reflected Sound*: Besides that *Eccho's* are seldom created, but by loud *Sounds*. And therfore there is lesse hope of *Artificiall Eccho's* in Aire, pent in a narrow Concaue. Neuertheless it hath beene tried, that One leaning ouer a *Well*, of 25. Fathome deepe, and speaking, though but softly, (yet not so soft as a whisper,) the *Water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caues*, where there is no Issue, saue where you speake, will not yeeld *Eccho's*, as *Wells* doe.

245 The *Eccho* commeth as the *Original Sound doth*, in a Round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercussing maketh an Angle: As against the Returne of a Wall, &c. Also we see that in *Mirrours*, there is the like Angle of Incidence, from the Obiect to the Glasse, and from the Glasse to the Eye. And if you strike a *Ball* side-long, not full vpon the Surface, the Rebound will be as much the contrary way; Whether there be any such *Resilience* in *Eccho's*, (that is, whether a Man shall heare better, if he stand aside the Body Repercussing, than if he stand where he speaketh, or any where in a right Line betweene;) may be tried. Triall likewise would be made, by Standing nearer the Place of Repercussing, than he that speaketh; And againe by Standing further off, than hee that speaketh; And so Knowledge would be taken, whether *Eccho's*, as well as *Original Sounds*, be not strongest neare hand.

246 There be many Places, where you shall heare 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.

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

248 To make an *Eccho*, that will report, three, or foure, or fiue Words, distinctly, it is requisite, that the *Body Repercussing*, be a good distance off: For if it be neare, and yet not so neare, as to make a *Concurrent Eccho*, it choppeth with you vpon the sudden. It is requisite likewise, that the *Aire* be not much *pent*. For *Aire*, at a great distance, *pent*, worketh the same effect with *Aire*, *at large*, in a small distance. And therefore in the *Triall* of *Speaking* in the *Well*, though the *Well* was deepe, the *Voice* came backe, suddenly; And would beare the Report but of two Words.

For

For *Eccho's* vpon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neere a Towne called *Pont-charenton*; And some Bird-bolt shot, or more, from the Riuer 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 Roofe all open, not so much as any Embowment neere any of the walls left. There was against euery Pillar, a Stacke of Billets, aboue a Mans Height; which the Watermen, that bring Wood downe the *Seane*, in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it returne the Voice thirteene seuerall times; And I haue heard of others, that it would returne sixteene times: For I was there about three of the Clocke in the Afternoone: And it is best, (as all other *Eccho's* are) in the Euening. It is manifest, that it is not *Eccho's* from seuerall places, but a *Tossing* of the *Voice*, as a Ball, to and fro; Like to *Reflexions* in *Looking-glasses*; where if you place one *Glasse* before, and another behinde, you shall see the *Glasse* behinde with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and diuers such *Super-Reflexions*, till the *species speciei* at last die. For it is euery Returne 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 euery *Reflexion* is weaker than the former: So that, if you speake 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 Returne, it is much to heare foure or fiue Words; In this *Eccho* of so many Returnes, vpon the matter, you heare aboue twenty Words, for three. 249

The like *Eccho* vpon *Eccho*, but only with two Reports, hath beene obserued to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will gine a *Backe-Eccho*; One taking it from the other, and the latter the weaker. 250

There are certaine *Letters*, that an *Eccho* will hardly expresse; As *S*, for one; Especially being Principiall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to be the Worke of Spirits, and of good Spirits. For, (said he) call *Satan*, and the *Eccho* will not deliuer backe the Deuils name; But will say, *Vat' an*; Which is as much in *French*, as *Apage*, or *Auoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hissing and an *Interiour Sound*. 251

Eccho's are some more sudden, and chopagaine, as soone as the *Voice* is deliuered; As hath beene partly said: Others are more deliberate, that is, giue more Space betweene the *Voice*, and the *Eccho*; which is caused by the locall Nearenesse, or Distance: Some will report a longer Traine of Words; And some a shorter: Some more loud (full as loud as the *Ori-* 252

ginall, and sometimes more loud ;) And some weaker and fainter.

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

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe through diuers *Mediums*, (as *Aire, Cloth, Wood*) it would deliuer the *Sound*, in a differing Place, from that vnto which it is deferred ; which is the Proper Effect of *Refraction*. But *Maioration*, which is also the Worke of *Refraction*, appareth plainly in *Sounds*, (as hath beene handled at full ;) But it is not by Diuersitie of *Mediums*.

Experiments in Cõsort touching the *Consent* and *Dissent* between *Visibles* & *Audibles*.

We haue *obiter*, for Demonstrations sake, vsed in diuers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But wee thinke good now to prosecute that *Comparison* more fully.

CONSENT OF VISIBLES, and Audibles.

255 *Both* of them *spread themselues in Round*, and fill a whole Floare or Orbe, vnto certaine Limits : And are carried a great way : And doe languish and lessen by degrees, according to the Distance of the Obiects from the Sensories.

256 *Both* of them haue the whole *Species in euery small Portion of the Aire*, or *Medium* ; So as the *Species* doe passe through small Crannies, without Confusion : As we see ordinarily in *Leuels*, as to the *Eye* ; And in *Crannies*, 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 remoue the *Light* ; Or touch the *Bodies* that giue the *Sound*.

258 *Both* of them doe *receiue* and *carry exquisite* and *accurate Differences* ; As of Colours, Figures, Motions, Distances, in *Visibles* ; And of Articulate Voices, Tones, Songs, and Quauerings, in *Audibles*.

259 *Both* of them in their Vertue and Working, doe not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their Vertue ; Neither againe to raise or stirre any *euident locall Motion* in their *Mediums*, as they passe ; But only to carry certaine *Spirituall Species* ; The perfect Knowledge of the Cause whereof, being hitherto scarcely attained, wee shall search and handle in due place.

260 *Both* of them seeme not to *generate* or *produce* any other *Effect in Nature*,

ture, but such as appertaineth to their proper Obiects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The First, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Obiect of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neare the Eare) the Hearing: The Third, in that *both of them will be reuerberate*; As in *Mirrours*; And in *Eccho'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 *è contrà*. 262

Both of them *affect the Sense in Liuing Creatures*, and yeeld *Obiects of Pleasure and Dislike*: Yet neuertheless, the *Obiects* of them doe also (if it be well obserued) affect and worke vpon dead Things; Namely, such as haue some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke vpon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* vpon the Places of *Eccho*, which resemble, in some sort, the Cauerne and structure of the Eare. 263

Both of them doe *diuersly worke, as they haue their Medium diuersly disposed*. So a Trembling *Medium* (as Smoake) maketh the Obiect seeme 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 Conducible, is *Aire*; For Glasse or Water, &c. are not comparable. 265

In *Both* of them, where the *Obiect is Fine and Accurate*, it conduceth much to haue the *Sense Intentiue, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentiuely; which in Beasts that haue Eares moueable, is most manifest. 266

The *Beames* of *Light*, when they are *multiplyed*, 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 *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it be true (which is anciently reported) that *Birds*, with great shouts, haue fallen downe. 267

DISSENTS OF VISIBLES, and Audibles.

268 THe *Species* of *Visibles* seeme to be *Emissions* of *Beames* from the *Obiect seene*; Almost like Odours; saue that they are more Incorporeall: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions* or *Impressions* made vpon the *Aire*. So that whereas all Bodies doe seeme to worke 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* seeme to be carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceiue) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, aboue all others, betweene *Visibles* and *Audibles*, that is the most remarkable; As that wherupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are *carried in Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies be cleare, and the Pores in a Right Line, as in Glasse, Crystall, Diamonds, Water, &c. But a thin Scarse, or Handkerchiefe, though they be Bodies nothing so solide, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but solide Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small Glasses suffice; but to the *Reuerberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

271 *Visibles* are seene further off, than *Sounds* are heard; Allowing neuertheless the *Rate* of their *Bignesse*: For otherwise a *great Sound* will be heard further off, than a *Small Body* seene.

272 *Visibles* require (generally) some *Distance* betweene the *Obiect*, and the *Eye*, to bee better seene; Wheras in *Audibles*, the neater the Approch of the *Sound* 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 Eye (all ouer,) excludeth the *Light*. For I haue heard of a Person very credible, (who himselfe was cured of a Cataract in one of his Eyes,) that while the Siluer Needle did worke vpon the Sight of his Eye, to remoue the Filme of the Cataract,

ract, he neuer 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 *Eye*, and so tooke not the Light from it. The other Errour may be, for that the *Obiect* of *Sight* doth strike vpon the *Pupill* of the *Eye*, directly without any interception; wheras the *Caue* of the *Eare* doth hold off the *Sound* a little from the Organ: And so neuertheless there is some *Distance* required in both.

Visibles are swiftlier carried to the *Sense*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which haue beene set downe heretofore, but are proper for this *Title*. 273

I conceiue also, that the *Species* of *Audibles* doe hang longer in the Aire, than those of *Visibles*: For although euen those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* sillipped; A *Fire-brand* caried along, which leaueth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceiue that *Sounds* stay longer, because they are carried vp and downe with the Winde: And because of the Distance of the Time, in *Ordnance discharged*, and *heard* twenty Miles off. 274

In *Visibles*, there are not found Obiects so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Obiects. And therefore in *Pictures*, those foule Sights doe 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 *Musicke*, the Eare doth straight-waies refuse. 275

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* 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 deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neare the *Cataracts* of *Nilus*, are strucken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell vpon Bridges. 276

It seemeth that the *Impression* of *Colour* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; wherof the Basis is in the Obiect, and the Verticall Point in the Eye; So as there is a Corradiation and Coniunction 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*, wherof we speake not. For the *Beames* passe, and giue little Tincture to that Aire, which is Adiacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreene between the Candle and the Eye, yet the *Light* passeth to the Paper wheron One writeth; So that the *Light* is seene, where the Body of the *Flame* is not seene; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not be seene. I iudge that *Sound* is of this Latter Nature: 277

ture: For when two are placed on both ſides of a Wall, and the Voice is heard, I iudge it is not onely the *Originall Sound*, which paſſeth in an *Arched Line*; But the *Sound*, which paſſeth aboue the Wall in a Right Line, begetteth the like Motion round about it, as the firſt did, though more weake.

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

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

279 There is a Common Obſeruation, that if a *Lute*, or *Viall*, be layed vpon the Backe, with a ſmall Straw vpon one of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute* or *Viall*, the *Vniſon* to that *String* be ſtrucken; it will make the *String* moue; Which will appeare both to the Eye, and by the *Strawes* 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 onely Motion.

280 It was deuiſed, that a *Viall* ſhould haue a Lay of Wire Strings below, as cloſe to the Belly, as a *Lute*; And then the *Strings* of Guts mounted vpon a Bridge, as in Ordinary *Vialls*; To the end, that by this means, the vpper *Strings* ſtrucken, ſhould make the lower reſound by *Sympathy*, and ſo make the *Muſicke* the better; Which, if it be to purpoſe, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this deuice I conceiue to be of no vſe; becauſe the vpper *Strings*, which are ſtopped in great variety, cannot maintaine a *Diapaſon* or *Vniſon*, with the Lower, which are neuer ſtopped. But if it ſhould be of vſe at all; it muſt be in *Inſtruments* which haue no Stops; as *Virginalls*, and *Harpes*; wherin triall may be made of two Rowes 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 *Vniſon*, whether the ſtriking of the one would moue the other, more than if it were another Accord: And ſo in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would moue in the one *Pipe*, when the other is blowne at an *Vniſon*.

282 It ſeemeth, both in *Eare*, and *Eye*, the *Inſtrument* of *Senſe* hath a *Sympathy* or Similitude with that which giueth the *Reflexion*; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a Cryſtall, or Glaſſe, or Water; So is the *Eare* a ſinuous Caue, with a hard Bone, to

ſtop

ſtop and reuerberate the *Sound:* Which is like to the Places that repott *Eccho's.*

When a Man *Yawneth*, he cannot *Heare* ſo well. The *Cauſe* is, for that the *Membrane* of the *Eare* is extended; And ſo rather caſteth off the *Sound*, than draweth it to. Experiments in Conſort, touching the *Hindring* or *Helping* of the *Hearing.*

We *Heare* better when we *hold our Breath*, than contrary; In ſo much as in all Liſtening to attaine a *Sound* a farre off, Men *hold their Breath.* The *Cauſe* is, For that in all *Expiration*, the Motion is Outwards; 283
And therefore, rather driueth away the voice, than draweth it: And 284
beſides we ſee, that in all *Labour* to doe things with any ſtrength, we *hold the Breath:* And liſtening after any *Sound*, that is heard with difficulty, is a kinde of *Labour.*

Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceiue it like- 285
ly to ſucceed,) to make an *Inſtrument* like a *Tunnell*; The narrow Part whereof may be of the Bigneſſe of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow End of it be ſet cloſe to the *Eare*: And marke whether any *Sound*, abroad in the open Aire, will not be heard diſtinctly, from further diſtance, than without that Inſtrument; being (as it were) an *Eare-Spectacle.* And I haue heard there is in *Spaine*, an *Inſtrument* in vſe to be ſet to the *Eare*, that *helpeth* ſomewhat thoſe that are Thicke of Hearing.

If the *Mouth* be ſhut cloſe, neuertheleſſe there is yeelded by the 286
Rooſe of the Mouth, a Mutmur. Such as is vſed by dumbe Men: But if the *Noſtrills* be likewiſe ſtopped, no ſuch Murmur can be made; Except it be in the Bottome 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*, thorow the *Noſtrills.*

The *Repercuſſion* of *Sounds*, (which we call *Eccho*,) is a great Argu- Experiments in Conſort touching the *Spirituall* and *Fine Nature* of *Sounds.*
ment of the *Spirituall Eſſence* of *Sounds.* For if it were *Corporeall*, the Repercuſſion ſhould be created in the ſame maner, and by like *Inſtruments*, with the *Originall Sound:* But we ſee what a Number of *Exquiſite Inſtruments* muſt concurre in Speaking of Words, whereof there is no ſuch 287
Matter in the Returning of them; But onely a plaine Stop, and *Repercuſſion.*

The Exquiſite *Differences* of *Articulate Sounds*, carried along in the 288
Aire, ſhew that they cannot be *Signatures* or *Impreſſions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales 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 doe ſuddenly periſh; But nei- 289
ther that, nor the *Exquiſite Differences* of them, is Matter of ſo great Admiration: For the Quauerings, and Warblings in Lutes, and Pipes, are

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 vttered. But that *Sounds* should not onely be so speedily generated, but carried so farre euery way, in such a momentany time, deserueth more Admiration. As for Example; If a Man stand in the middle of a Field, and speake aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in euery little Portion of the Aire; And this shall be done in the Space of lesse than a Minute.

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

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

We haue laboured (as may appeare,) 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 *Incorporeall*, and *Immateriate*; wherof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a Patterne or President of an *Exact Inquisition*; And we shall doe the like hereafter in some other Subiects which require it. For we desire that Men should learne and perceiue, how seuere a Thing the true *Inquisition* of *Nature* is; And should accustome themselues, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the World; And not reduce the World to the Narrownesse of their Mindes.

Experiment Solitary touchinge

Metalls giue *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giueth an

an excellent Yellow; *Quick-Siluer* an excellent Greene; *Tinne* giueth 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 againe to retaine Part of their principall Spirit; Which two Things, (Equall Posture, and Quicke Spirits) are required chiefely, to make *Colours* lightsome.

ching the *Orient Colours*, in *dissolution* of *Metalls*. 291

It conduceth vnto *Long Life*, and to the more Placide Motion of the Spirits, which thereby doe lesse prey and consume the Iuyce of the Body; Either that *Mens Actions bee free and voluntary*; That nothing bee done *Inuitâ Minerua*, but *Secundum Genium*: Or on the other side, that the *Actions* of *Men bee full of Regulation*, *and Commands within themselues*: For then the Victory and Performing of the Command, giueth a good Disposition to the Spirits; Especially if there bee 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 doe continually enioyne themselues.

Experiment Solitary touching *Prolongation* of *Life*. 292

It is certaine, that in all Bodies, there is an *Appetite* of *Vnion*, and Euitation of Solution of Continuity: And of this *Appetite* there bee many *Degrees*; But the most Remarkable, and fit to bee distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleauing* or *Tenacious*. In *Liquours*, this *Appetite* is weake: Wee see in *Liquours*, the *Thredding* of them in *Stillicides*, (as hath beene said;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles and Froth*. In the second *Degree* or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly sticke and continue to themselues; And therefore they roape, and draw themselues in Threds; As wee see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleauing*, more or lesse: And that they loue better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantity, cleaueth to any Thing that is Solide; And so would *Metall* too, if the weight drew it not off. And therfore *Gold Foliate*, or any *Metall Foliate*, cleaueth: But those *Bodies* which are noted to bee Clammy, and Cleauing, are such, as haue a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to Themselues. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a Forraine

Experiment Solitary touching *Appetite* of *Vnion* in *Bodies*. 293

Body, than in preseruing their owne *Consistence*; And which haue little predominance in *Drought*, or *Moisture*.

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

294

Time, and *Heat*, are Fellowes in many Effects. *Heat* drieth Bodies, that doe easily expire; As Parchment, Leaues, Roots, Clay, &c. And, so doth *Time* or *Age* arefie; As in the same Bodies, &c. *Heat* dissolueth and melteth Bodies, that keepe in their Spirits; As in diuers *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 Oyle, which is euer more cleare, and more hot in Medicinable vse. *Heat* causeth the Spirits to search some Issue out of the Body; As in the *Volatility* of *Metalls*; And so doth *Time*; As in the *Rust* of *Metalls*. But generally *Heat* doththat in small time, which *Age* doth in long.

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

295

Some Things which passe the *Fire* are softest at first, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards giue againe, and grow soft, as the Crust of Bread, Bisker, Sweet Meats, Salt, &c. The *Cause* is, for that in those things which waxe Hard with *Time*, the Worke of the *Fire* is a Kinde of *Melting*: And in those that waxe Soft with *Time*, (contrariwise,) the worke of the *Fire* is a Kinde of *Baking*; And whatsoeuer the *Fire* baketh, *Time* doth in some degree dissolue.

Experiment Solitary touching *Motions* by *Imitation*.

296

Motions passe from one Man to another, not so much by Exciting Imagination; as by Imitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heauy, by any Vapour, or the like. For then they striue, (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleepe; Or before the Fit of an Ague; doe vse to Yawne and Stretch; And doe likewise yeeld a *Voice* or *Sound*, which is an *Interiection* of *Expulsion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment Solitary, touching *Infectious Diseases*.

297

There be some knowne *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 passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as *Taint* the *Breath*; Which wee see passeth manifestly from Man to Man; And not inuisibly, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adiacent*.

Adiacent; Especially if they consist in an Vnctuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprousie*. Fourthly, such as are meerely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they neuer infect, but by *Touch* onely; And such a *Touch* also, as commeth within the *Epidermis*; As the Venome of the *French Poxe*; And the *Biting* of a *Mad Dog*.

Most *Powders* grow more Close and Coherent by *Mixture* of *Water*, than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; As *Meale*; &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 betweene *Them* and *Water*, than betweene *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment Solitary touching the *Incorporation* of *Powders* and *Liquours*. 298

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 vpon *Exercise*. Likewise Men ought to beware, that they vse 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 Excrete by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Euills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe 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* liue longer than *Men*, because they stirre lesse.

Experiment Solitary, touching *Exercise* of the *Body*. 299

Some *Food* we may vse *long*, and *much*, without *Glutting*; As Bread, Flesh that is not fat, or rancke, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The *Cause* is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the Stomacke; 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 Stomacke; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and euer abateth the Appetite. Wee see also, that another *Cause* of *Saciety*, is an *Ouer-custome*; and of *Appetite* is *Nouelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To giue the Reason of the *Distast* of *Saciety*, and of the *Plea-*

Experiment Solitary, touching *Meats*, that *induce Saciety*. 300

ſure in *Nouelty*; and to diſtinguiſh not onely in Meats and Drinkes, but alſo in Motions, Loues, 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 Relliſh by former vſe. And (generally) it is a Rule, that whatſoeuer is ſomewhat Ingrate at firſt, is made Gratefull by *Cuſtome*; But whatſoeuer is too Pleaſing at firſt, groweth quickly to *ſatiate*.

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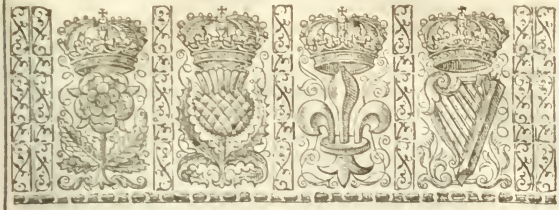

NATVRALL HISTORIE.

IV. Century.

ACCELERATION of *Time*, in *Works* of *Nature*, may well be esteemed *Inter Magnalia Naturæ*. And euen in *Diuine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therfore proceed to the Enquiry of it: And for *Acceleration* of *Germination*, we will referre it ouer, vnto the place, where we shall handle the Subiect of *Plants*, generally; And will now begin with other *Accelerations*.

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

Liquours are (many of them,) at the first, thicke and troubled; As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Hearbs* expressed, &c. And by *Time* they settle, and Clarifie. But to make them cleare, before the *Time*, is a great Worke; For it is a Spurre to Nature, and putteth her out of her pace: And besides, it is of good vse, for making *Drinkes*, and *Sauces*, Potable, and Seruiceable, 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 *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts*: For that euer representeth Bodies Cleare and Vntroubled. 301

bled. The third, by the *Refining* the *Spirit it selfe*, which therby giueth to the *Liquour* more Splendour, and more Lustre.

302 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 seuerall Parts, either vp, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*; which Viscous Body (afterwards seuered) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

303 Secondly, for the *Euen Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speake not, because it is that, we would anticipate & 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 passe 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 therfore (hauing shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

305 It is in common Practise, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) wherby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast vp 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 owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therfore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessell from the *Lees*, and powre the *Lees* of the Racked Vessell into the vnracked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, wherby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquour*, the more thicke and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*, the clearer it is. The Reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or settleth at the Bottome. And therfore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, 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 Beere*, almost

almost to the very Neck: Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* euery day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beere* set by. Take also Lime both *Quenched*, and *Vnquenched*, and set the Bottles in them, *vt suprà*. This *Instance* is referred, both to the *Euen Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheele-Barrow*, vpon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leaue some Aire; For if the *Liquour* come close to the Stopple, it cannot play, nor flower: And when you haue shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the vsuall manner; For if it stay with much Aire in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24. houres: Then take it, and put it againe into a *Bottle* with *Aire*, *vt suprà*: And thence into a *Bottle Stopped*, *vt suprà*: And so repeat the same *Operation* for seuen dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a *Bottle* with a little Aire below the Neck, without Emptying. This *Instance* is referred to the *Euen Distribution* and *Refining* of the *Spirits* by *Motion*. 310

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*,) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New Beere*, and stirred with it: For it may be that the Grosser Part of the *Beere* will cleaue to the *Milke*: The Doubt is, whether the *Milke* will seuer well againe; Which is soone tried. And it is vsuall in *Clarifying Ippocrasse* to put in *Milke*; Which after seuereth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they vse to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be. 311

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Vlcers*. This last we referre to another Place, where wee shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metalls*, &c. whereof we will speake as Occasion seruеth. But we will begin with that of *Drinkes*, because it hath such Affinitie with the *Clarification* of *Liquours*.

Experiments in Consort touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickning* of *Drinks*. 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 wee spake before;) But then note, that an Extreme *Clarification* doth 312

ſpread the *Spirits* ſo Smooth, as they become Dull, and the *Drinke* dead, which ought to haue a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

313 We ſee the *Degrees* of *Maturation* of *Drinkes*; In *Muſt*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Muſt* hath not the *Spirits* well Congregated; *Wine* hath them well vnited; ſo as they make the Parts ſomewhat more Oylie: *Vinegar* hath them Congregated, but more Ieiune, and in ſmaller Quantitie; The greateſt and fineſt Spirit and Part being exhaled: For we ſee *Vinegar* is made by ſetting the Veſſell of *Wine* againſt the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

314 The *Refreſhing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So wee ſee that *Open Weather* relaxeth the *Spirit*, and maketh it more liuely in *Motion*. Wee ſee alſo *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (ſo that it ſpirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windie. A *Pan* of *Coales* in the *Cellar* doth likewiſe good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is *Dead*, prouoketh it to worke againe: Nay, which is more, (as ſome affirme,) *A Brewing of New Beere*, ſet by *Old Beere*, maketh it worke againe. It were good alſo to *Enforce* the *Spirits* by ſome *Mixtures*, that may excite and quicken them; As by Putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We ſee *Creame* is *Matured*, and made to riſe more ſpeedily, by Putting in *Cold Water*; which, as it ſeemeth, getteth downe the *Whey*.

315 It is tried, that the *Burying* of *Bottles of Drinke* well ſtopped, either in *drie Earth*, a good depth; Or in the *Bottome* of a *Well within Water*; And beſt of all the *Hanging* of them in a *deepe Well* ſomewhat *aboue the Water*, for ſome forthnights ſpace, is an Excellent *Meanes* of making *Drink* freſh, and quicke: for the *Cold* doth not cauſe any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the reſt that remaine: 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 *Chalke*; In *Lime*; Couered ouer with *Onions*; Couered ouer with *Crabs*; Cloſed vp in *Wax*; Shut in a *Box*; &c. There was alſo an *Apple* hanged vp in *Smoake*: Of all which the *Experiments* ſorted in this Manner.

318 After a Moneths Space, the *Apple* Encloſed in *Wax*, was as Greene and Freſh as at the firſt Putting in, and the *Kernells* continued White. The *Cauſe* is, for that all *Excluſion* of *Open Aire*, (which is euer Predatory) maintaineth the Body in his firſt Freſhneſſe, and Moiſture: But the Inconuenience

conuenience is, that it tasteth a little of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Drie, 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 haue a Skin of Cole) doth Mellow, and not Adure: The *Smoake* 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 Ouen, and Remouing of them often as they begin to Swear, there is a like Operation; But that is with a farre more Intense degree of *Heat*. 319

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

The *Apples*, *Couered* 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 Hardnesse. So wee see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first vpon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citiùs maturescit*. 321

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* haue a very low degree of *Heat*, but yet Close and Smoothering, and which drieth not. 322

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

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

Take an *Apple*, or *Peare*, or other like *Fruit*, and *Rowle* it vpon a Table hard: Wee see in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Vnequall Distribution* of the *Spirits* maketh the Harrishnesse: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therefore, if you should *Rowle* them but gently, perhaps twice a day; And continue it some seuen dayes, it is like they would *mature* more finely, and like vnto the *Naturall Maturation*. 324

Take an *Apple*, and cut out a Peece of the Top, and couer it, to see whether that *Solution of Continuitie* will not hasten a *Maturation*: We see 325

that where a *Waspe*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

326 Take an *Apple*, &c. and pricke it with a *Pinne* full of *Holes*, not deepe, and smeare it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, euery day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these Trialls *also, as was vsed in the first, set another of the same* Fruits *by, to Compare them: And trie them, by their* Yellownesse, *and by their* Sweetnesse.

Experiment Solitary, touching the *Making* of *Gold*.

The World hath beene much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I iudge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practise, full of Errour and Imposture; And in the Theory, full of vnsound Imaginations. For to say, that *Nature* hath an Intention to make all Metals *Gold*; And that, if she were deliuered from Impediments, she would performe her owne Worke; And that, if the Crudities, Impurities, and Leprosities of *Metals* were cured, they would become *Gold*; And that a little *Quantitie* of the *Medicine*, in the Worke of *Proiection*, will turne a Sea of the *Baser Metall* into *Gold*, by *Multiplying*: All these are but dreames: And so are many other Grounds of *Alchymy*. And to helpe the Matter, the *Alchymists* call in likewise many Vanities, out of *Astrologie*; *Naturall Magicke*; Superstitious Interpretations of *Scriptures*; Auricular *Traditions*; Faigned Testimonies of *Ancient Authors*; And the like. It is true, on the other side, they haue brought to light not a few profitable *Experiments*, and thereby made the World some amends. But wee, when wee shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true Wayes and Passages of *Nature*, which may leade to this great Effect. And wee commend the wit of the *Chineses*, who despaire of Making of *Gold*, but are Mad vpon the Making of *Siluer*: For certaine it is, that it is more difficult to make *Gold*, (which is the most Ponderous and Materiate amongst *Metalls*) of other *Metalls*, lesse Ponderous, and lesse Materiate; than (*vià versâ*) to make *Siluer* of *Lead*, or *Quick-Siluer*; Both which are more Ponderous than *Siluer*; So that they need

need rather a further Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and therby Turning some of them into *Gold*: For we conceiue indeed, that a perfect good *Concoction*, or *Digestion*, or *Maturation* of some *Metalls*, will produce *Gold*. And here we call to minde, that wee knew a *Dutch-man*, that had wrought himselfe into the beleefe of a great Person, by vndertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Ouer-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lampe, that should carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Deuice of the Lampe was folly; But the Ouer-firing now vsed; And the Equall Heat to be required; And the Making it a Worke of some good Time; are no ill Discourses.

We resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be *vsed a Temperate Heat*; For they are euer *Temperate Heats* that *Disgest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subiect*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all vpon *Metalls*. The Second is, that the *Spirit of the Metall be quickened*, and the *Tangible Parts opened*: For without those two Operations, the *Spirit* of the *Metall*, wrought vpon, will not be able to disgest the Parts. The Third is, that the *Spirits doe spread themselues Euen*, and *moue not Subsultorily*; 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 *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the Fire; And partly by the closenesse of the Vessell. The

Fifth

Fifth is, that there be *Choice made of the likelieſt and beſt Prepared Metall, for the Verſion:* For that will facilitate the Worke. The Sixth is, that you giue *Time enough for the Worke:* Not to prolong Hopes (as the Alchymiſts doe;) but indeed to giue *Nature* a conuenient Space to worke in. Theſe Principles are moſt certaine, and true; Wee will now deriue a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improued.

327 Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be ſuch, as may keepe the *Metall perpetually Moulten*, and no more; For that aboue all importeth to the Worke. For the Materiall, take *Siluer*, which is the *Metall* that in Nature Symbolizeth moſt with *Gold*; Put in alſo, with the *Siluer*, a Tenth Part of *Quick-ſiluer*, 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 Moneths*, at the leaſt. I wiſh alſo, that there be, at ſome times, an Iniection of ſome *Oyled* Subſtance; Such as they vſe in the Recouering of *Gold*, which by Vexing with Separations hath beene made Churliſh: And this is, to lay the Parts more Cloſe and Smooth, which is the Maine Worke. For *Gold* (as we ſee) is the Cloſeſt (and therefore the Heauieſt) of *Metalls:* And is likewiſe the moſt Flexible, and Tenſible. Note, that to thinke to make *Gold* of *Quick-ſiluer*, becauſe it is the heauieſt, is a Thing not to be hoped; For *Quick-ſiluer* will not endure the Mannage of the *Fire*. Next to *Siluer*, I thinke *Copper* were fitteſt to bee the *Materiall*.

Experiment Solitary touching the *Nature* of *Gold*.

328 *Gold* hath theſe *Natures: Greatneſſe of Weight*; *Cloſeneſſe of Parts*; *Fixation*; *Pliantneſſe*, or *Sofineſſe*; *Immunity from Ruſt*; *Colour* or *Tincture of Yellow*. Therfore the Sure Way, (though moſt about,) to make *Gold*, is to know the *Cauſes* of the Scuerall *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?

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

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subiect of a very Vniuerſall Enquiry: For *Corruption* is a Reciprocall to *Generation:* And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which euer are Vnquiet to *Get forth*, and *Congregate* with the *Aire*, and to enioy the *Sunbeames*. The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*,) hath fiue Differing *Operations*. If the

the *Spirits* be detained within the Body, and moue more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildely, there followeth *Digestion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* be not meerely Detained, but Protrude a little, and that Motion be Confused, and Inordinate, there followeth *Putrefaction*; Which euer dissolueth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metalls*. But if that Motion be in a certaine Order, there followeth *Viuification*, and *Figuration*; As both in *Liuing Creatures* bred of *Putrefaction*, and in *Liuing Creatures Perfect*. But if the *Spirits* issue out of the Body, there followeth *Deficcation*, *Induration*, *Consumption*, &c. As in *Bricke*, Euaporation of *Bodies Liquid*, &c.

The *Meanes* to *Induce* 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 *Vnctuous* and *Oyly Substances* preserue. 329

The Second is by *Inuitation or Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is *Sound*: Or when *Dung* (which is a Substance already Putrified) is added to other Bodies. And this is also notably seene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will. 330

The Third is, by *Closenesse*, and *Stopping*, which *detaineth* the *Spirits*, *in Prison*, more than they would; And thereby irritateth them to seeke Issue; As in Corne, and Cloaths, which waxe Musty; and therefore Open Aire (which they call *Aer perflabilu*) doth preserue: And this doth appeare more Euidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning* the *Humours*, which thereupon *Putrifie*. 331

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 aliue, where they haue receiued any Wound. 332

The Fifth is, either by the *Exhaling*, or by the *Driuing back* of the *Principall Spirits*, which preserue the Consistence of the *Body*; So that when their Gouernment is Dissolued, euery *Part* returneth to his Nature, or Homogeny. And this appeareth in *Vrine*, and *Blood*, when they coole, and thereby breake; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceiue also the same Effect is in *Pestilences*, for that the *Malignity* of the *Infecting Vapour*, daunceth the *Principall Spirits*, and maketh them fly, and leaue their *Regiment*; And then the *Humours*, *Flesh*, and *Secondary Spirits*, doe dissolue, and breake, as in an *Anarchy*. 333

The

334 The Sixth is, when a *Forraine Spirit, Stronger and more Eager than the Spirit of the Body, entreth the Body*; As in the Stinging of Serpents. And this is the *Cause* (generally) that vpon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* it selfe, Congregate too much; As vpon *Blowes*, and *Bruises*; Or when they are *Pent in too much*, as in *Swelling* vpon *Cold*. And we see also, that the *Spirits* comming of *Putrefaction* of *Humours* in *Agues*, &c. Which may be counted as *Forraine Spirits*, though they be bred within the Body, doe Extinguish and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seuenth is, by such a *Weake Degree of Heat, as setteth the Spirits in a little Motion, but is not able, either to disgest the Parts, or to Issue the Spirits*; As is seene in Flesh kept in a Roome that is not Coole; Whereas in a Coole and Wet Larder it will keepe longer. And wee see, that *Viuification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336 The Eight is, by the *Releasing of the Spirits*; which before were close kept by the Solidnesse of their Couerture, 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 softeneth the Crust, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and dry*; As wee see in the Mouldring of Earth in Frosts, and Sunne; And in the more hasty Rotting of Wood, that is sometimes wet, sometimes dry.

338 The Tenth is, by *Time, and the Worke and Procedure of the Spirits themselues*, which cannot keepe their Station; Especially if they be left to themselues; And there be not Agitation or Locall Motion. As wee see in Corne not stirred; And Mens Bodies not exercised.

339 All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Orenges*, and *Limons*; which *Moulds* afterwards turne into Wormes, or more odious *Putrefactions*: And therfore (commonly) proue to be of ill Odour. And if the Body be Liquid, and not apt to Putrifie totally, it will cast vp a *Mother* in the Top; As the *Mothers* of *Distilled Waters*.

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

Experiments in Consort, touching *Prohibiting* and *Preuenting Putrefaction*.

It is an *Enquiry* of Excellent vse, to Enquire of the *Meanes* of *Preuenting* or *Staying Putrefaction*, For therein consisteth the *Meanes* of *Conseruation* of *Bodies*; For *Bodies* haue two Kindes of *Dissolutions*; The one by *Consumption*, and *Deficcation*; The other by *Putrefaction*. But as for the *Putrefactions* of

of the *Bodies* of *Men*, and *Liuing Creatures*, (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Vlcers both Inwards and Outwards,) they are a great *Part of Physicke*, and *Surgery*: And therefore we will reserue 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 beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Remouing that, which caused *Putrefaction*, doth Preuent and Auoid *Putrefaction*.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: 341
For so wee see that Meat and Drinke will last longer, Vnputrified, or Vnsowred, in Winter, than in Summer: And we see that Flowers, and Fruits, put in Conseruatories of Snow, keepe fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*.

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

The Third is, the Excluding of the *Aire*; And againe, the *Exposing* 343
to the Aire: For these Contraries, (as it commeth often to passe,) worke the same Effect, according to the Nature of the Subiect Matter. So we see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners vnder Ground* keepe Corne longer than those aboue Ground; And that *Fruit closed in Waxe* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keepe more fresh: And *Liquours*, *Drinkes*, and *Iuices*, with a little *Oyle* cast on the Top, keepe fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed Moathes, and Mould; And the Diuersity is, that in *Bodies* that need *Detention* of *Spirits*, the *Exclusion of the Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*.

The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For 344
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 ouer of Corne in a Garner; Or Letting it runne like an Houre-glasse, from an vpper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens Bodies Exercise hindreth *Putrefaction*; And contrariwise *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.

345 The Fifth is, the *Breathing forth of the Aduentitious Moiſture in Bodies*; For as *Wetting* doth haſten *Putrefaction*; So *Conuenient Drying*, (wherby the more *Radicall Moiſture* is onely kept in,) putteth backe *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, keepe beſt. For the *Emiſſion* of the *Looſe* and *Aduentitious Moiſture*, doth betray the *Radicall Moiſture*; And carryeth it out for Company.

346 The Sixth is, the *Strengthning 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 preſerueth, and a Weake or Faint *Spirit* diſpoſeth to *Corruption*. So we finde that Salt-water corrupteth not ſo ſoone as Freſh: And Salting of Oiſters, and Powdring of Meat, keepeth them from *Putrefaction*. It would be tried alſo, whether *Chalke* put into *Water*, or *Drinke*, doth not preſerue it from *Putrefying*, or ſpeedy Souring. So wee ſee that *Strong Beere* will laſt longer than Small; And all Things, that are hot and Aromaticall, doe helpe to preſerue Liquours, or Powders, &c. Which they doe, as well by Strengthning the *Spirits*, as by Soaking out the looſe *Moiſture:*

347 The Seuenth is, *Separation of the Cruder Parts*, and thereby *making the Body more Equall*; for all vnperfect Mixture is apt to *Putrefie*; And Watry Subſtances are more apt to *Putrefie*, than Oyly. So we ſee Diſtilled Waters will laſt longer than Raw waters; And Things that haue paſſed the Fire, doe laſt longer, than thoſe that haue not paſſed the Fire; As Dried Peares, &c.

348 The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth:* Which is (commonly) the *Looſe and watry Moiſture*; Not onely for the Reaſon before giuen, that it prouoketh 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 dead Bodies:* And the ſame Reaſon is of *Preſeruing Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily*, or *Sweet:* For ſuch *Bodies* are leaſt apt to *Putrefie*, the *Aire* working little vpon them; And they not putrefying preſerue the reſt. And therfore we ſee *Syrrups*, and *Ointments*, will laſt longer, than *Iuyces*.

350 The Tenth is, the *Commixture of ſomewhat that is Dry*; For *Putrefaction* beginneth firſt from the *Spirits*; And then from the *Moiſture:* And that that is dry is vnapt to putrefie: And therefore Smoake preſerueth Fleſh; As wee ſee in Bacon, and Neats-Tongues, and Martlemas Beefe, &c.

351 The Opinion of ſome of the *Ancients*, that *Blowne Aires* doe preſerue Bodies, longer than other *Aires*, ſeemeth to Mee Probable; For that the *Blowne Aires*, being Ouer-charged and Compreſſed, will hardly receiue the Exhaling of any Thing, but rather repulſe it. It was tried in a *Blowne Bladder*, whereinto Fleſh was put, and likewiſe a Flower, and it ſorted not: For *Dry Bladders* will not *Blow:* And *New Bladders* rather

ther further *Putrefaction*: The way were therfore, to blow ſtrongly, with a Paire of Bellowes, into a Hogſhead, putting into the Hogſhead (before) that which you would haue preſerued; And in the inſtant that you withdraw the Bellowes, ſtop the Hole cloſe.

The *Experiment* of *Wood* that *Shineth* in the *Darke*, we haue diligently driuen, and purſued: The rather, for that of all Things, that giue Light here below, it is the moſt Durable; And hath leaſt Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* ſhineth onely while it is in Scraping; And *Salt-water* while it is in Daſhing; *Glow-wormes* haue their Shining while they liue, or a little after; Onely *Scales* of *Fiſhes* (Putrified) ſeeme 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* ſorted thus. 1. The *Shining* is in ſome Peeces more *Bright*, in ſome more *Dimme*; but the moſt *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that haue beene tried to ſhine, are chiefly *Sallow*, and *Willow*; Alſo the *Aſh*, and *Haſle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe ſhine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in ſome Peeces *White*, in ſome Peeces inclining to *Red*; Which in the Countrey they call the *White*, and *Red Garret*. 5. The Part that Shineth, is, (for the moſt part) ſomewhat *Soft*, and *Moiſt* to ſeele 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 looke to haue an Image, or the like, in any Thing that is Lightſome; For euen a face in Iron red Hot will not be ſeene, 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 fiue or ſix daies, *Loſt* the *Shining*; And laid abroad againe, *Recouered* the *Shining*. 9. *Shining woods*, being laid in a *Dry Roome*, within a Seuen night, loſe their Shining; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring of Holes*, in that kinde of Wood, and then laying it abroad, ſeemeth to conduce to make it *Shine*: The *Cauſe* is, for that all *Solution* of *Continuity* doth helpe on *Putrefaction*, as was touched before. 11. No *Wood* hath beene yet tried to *Shine*, that was cut *downe aliue*, but ſuch as was *Rotted*, both in Stocke, and Root, while it grew. 12. Part of the *Wood* that *Shined*, was *ſteeped in Oyle*, and retained the *Shining* a Forthnight. 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 euery Night*, and *taken in* and *Sprinckled* with *Water* in the *Day*, is not yet tryed. 15. Triall was

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

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lost

made of *laying it abroad in Frostie weather*, which hurt it not. 16. There was a great *Peece* of a *Root* which did shine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a drie Roome, it got a *Shining*.

Experiment Solitary touching the *Acceleration* of *Birth*

353

The *Bringing forth* of *liuing 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 downe: whereof the Former is good, and argueth Strength; The Latter is ill, and commeth by Accident or Disease. And therefore the Ancient *Obseruation* is true, that the *Childe borne in the Seuenth Moneth*, doth commonly well; But *Borne 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 Returne of the Raigne, of the *Planet Saturne*: which (as they say) is a *Planet* Maligne; whereas in the Seuenth is the Raigne of the *Moone*, which is a Planet Propitious. But the true *Cause* is, for that where there is so great a Preuention of the Ordinary time, it is the *lustinesse* of the *Childe*; 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 *Plentie* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* 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 Heighth. And you may take an Experiment from *Plants*, which, if they spread much, are seldome tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore Children in Dayrie Countries doe wax more tall, than where they feed more vpon Bread, and Flesh. There is also a receiued Tale; That Boyling of *Dasie Roots* in *Milke* (which it is certaine are great Driers) will make *Dogs* little. But so much is true, that an *Ouer-drie Nourishment* in Childhood putteth backe Stature. Secondly, the *Nourishment* must be of an *Opening Nature*; For that Attenuateth the Iuice, and furthereth the Motion of the Spirits, vpwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their Feeding vpon *Cardamon*; which (hee saith) made them grow better, and be of a more Actiue Habit. *Cardamon* is in Latine *Nasturtium*; And with vs *Water-Cresses*; Which, it is certaine, is an Herbe, that whilest it is yonng, is Friendly to Life. As for the *Quickening* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much Going to Schoole, where they sit so much, hindreth the *Growth* of *Children*; whereas Countrey People, that goe not to Schoole, are commonly of better Stature. And againe Men must beware, how they giue *Children*, any thing that is *Cold* in Operation; For euen *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tried, that a Whelpe, that hath beene fed with *Nitre* in *Milke*, hath become

come very little, but extreme liuely: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, 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 helpe to condense, and correct.

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

There be two *Great Families* of *Things*; You may terme them by seuerall Names; *Sulphureous* and *Mercuriall*, which are the *Chymists* Words: (For as for their *Sal*, which is their Third Principle, it is a Compound of the other two;) *Inflammable* and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For we see that in *Subterranies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*: In *Vegetables*, and *Liuing Creatures* there is *Water* and *Oyle*: In the *Inferiour Order* of *Pneumaticalls* 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 vnlike in the Primitiue Differences of Matter, yet they seeme to haue many Consents: For *Mercury* and *Sulphure* are principall Materialls of *Metalls*; *Water* and *Oyle*, are principall Materialls of *Vegetables*, and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in Vulgar Opinion) is but *Aire Incensed*; And they both haue Quicknesse of Motion, and Facility of Cession, much alike: And the *Interstellar Sky*, (though the Opinion be vaine, 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*. Therfore, it is one of the greatest *Magnalia Naturæ*, to turne *Water*, or *Watry Iuyce*, into *Oile* or *Oily* Iuyce: Greater in Nature, than to turne *Siluer*, or *Quick-siluer*, into *Gold*.

The Instances we haue, wherein *Crude* and *Watry* Substance turneth into *Fat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water*; which mingled by the helpe of the Sunne, gather a Nitrous Fatnesse, more than either of them haue seuerally; As we see, in that they put forth *Plants*, which need both Iuyces. 355

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Liuing Creatures*; Whereof *Plants* turne the Iuyce of meere *Water* and *Earth*, into a great deale of *Oily Matter*: *Liuing Creatures*, 356

tures, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two Wayes of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time.

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

358 The Fourth is in the *Dulcoration* of some *Metalls*; As *Saccharum Saturni*, &c.

359 The Intention of *Version* of *Water* into a more *Oily Substance*, is by *Disgestion*; For *Oile* is almost Nothing else but *Water disgested*; And this *Disgestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by Prouocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily*, or *Disgested*; For they will somewhat Communicate their Nature with the rest. *Disgestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Disgested*; As in *Plants*, and *Liuing Creatures*, whose Nourishment is far more Crude than their Bodies: But this *Disgestion* is by a great Compasse, as hath beene 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 leaue 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 giue Law to all *Bodies*.

Experiment Solitary touching *Chameleons*.

360 A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head vnproportionably bigge; His Eyes great: He moueth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skin sported with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath fiue Fingers; three on the Outside, and two on the Inside; His Tongue of a maruellous Length in respect of his Body, and hollow at the end; Which he will launch out to prey vpon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If hee be laid vpon Greene, the Greene predominateth; If vpon Yellow, the Yellow; Not so if he be laid vpon Blew, or Red, or White; Onely the Greene Spots receiue a more Orient Lustre: Laid vpon Blacke, he looketh al Blacke, though not without a Mixture of Greene. He feedeth not onely vpon Aire, (though that be his principall Sustenance;) For sometimes hee taketh *Flies*, as was said; Yet some that haue kept *Chameleons* a whole yeare together, could neuer perceiue that euer they fed vpon any Thing else but Aire; And might obserue their Bellies to swell after they had exhausted the Aire, and closed their Iawes; Which they open commonly

mon'ly against the Rayes of the Sunne. They haue a foolish Tradition in *Magicke*, that if a *Chamæleon* be burnt vpon the Top of a House, it will raise a Tempest; Supposing (according to their vaine Dreames of *Sympathies*) because he nourisheth with Aire, his Body should haue great vertue to make Impression vpon the Aire.

Experiment Solitary, touching *Subterrany 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 cleare, and cast not forth such Smoake, and Ashes, and Pummice, as *Mountaine Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which cast *Flame*. There be also some *Blinde Fires*, vnder *Stone*, which flame not out, but *Oile* being powred vpon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remoue the Stone, it is *Heat*, rather than *Flame*; Which neuertheless is sufficient to Enflame the *Oyle*.

Experiment Solitary, touching *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 selfe: 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 *Warme Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which seuereth and diuideth any thing that is foule, and Viscous, and sticketh vpon a Body.

Experiment Solitary touching *Congealing* of *Aire*. 363

Take a *Bladder*, the greatest you can get; Fill it full of Winde, and tye it about the Necke with a Silke thred waxed; And vpon that put likewise Wax very close; So that when the Neck of the *Bladder* dryeth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot vnder the *Earth*, in a *Vault*, or in a *Conseruatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after some Forthnights distance, see whether the *Bladder* be shruncke: For if it be, then it is plaine, 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.

Experiment Solitary touching *Congealing* of *Water* into *Crystall*. 364

It is a Report of some good credit, that in *Deepe Caues*, there are *Pensile Crystall*, and *Degrees* of *Crystall* that drop from aboue; And in some other, (though more rarely) that rise from below. Which though it be chiefly the Worke of Cold, yet it may be, that Water, that passeth thorow the Earth, gathereth a Nature more clammy, and fitter to Congeale, and become Solide, than Water of it selfe. Therfore Triall would be made, to lay a Heape of Earth, in great Frosts, vpon a Hollow Vessell, putting a Canuase betweene, that it falleth not in: And poure Water vpon it, in such Quantitie, as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessell, and

and leſſe apt to diſſolue, 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 Reuerſed, it will helpe the Experiment. For it will make the Ice, where it Iſſueth, leſſe in Bulke; And euermore Smalneſſe of Quantity is a Helpe to *Verſion*.

Experiment Solitary touching *Preſerueing* of *Roſe-leaues*, both in *Colour*, & *Smell*.

365 Take *Damaske Roſes*, and pull them; Then dry them vpon the Top of an Houſe, vpon a Lead or Tartas, in the hot Sunne, in a cleare day, betweene the Houres (onely) of twelue and two; or there abouts. Then put them into a Sweet *Dry 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 retaine, not onely their Smell Perfect, but their Colour freſh, for a yeare at leaſt. Note, that Nothing doth ſo much deſtroy any Plant, or other Body, either by *Putrefaction*, or *Arefaction*, as the *Aduentitious Moiſture*, which hangeth looſe in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moiſture*, along with it, when it ſelfe goeth forth. And therefore in *Liuing Creatures*, Moderate Sweat doth preſerue the Iuyce of the Body. Note that theſe *Roſes*, when you take them from the *Drying*, haue little or no *Smell*; So that the Smell is a Second *Smell*, that iſſueth out of the *Flower* afterwards.

Experiments in Conſort, touching the *Continuance* of *Flame*.

366 The *Continuance* of *Flame*, according vnto the diuerſity of the *Body Enflamed*, and other Circumſtances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almoſt) of a Momentany Laſting, yet it receiueth the More, and the Leſſe: we will firſt therfore ſpeake (at large) of *Bodies Enflamed*, wholly, and Immediately, without any *Wicke* to helpe the *Inflammation*. A Spoonefull 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 Spoonefull 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 diſſolued into a Blacke water, 110. Pulſes. A Cube, or Pellet of *Yellow Waxe*, was taken, as much as halfe the *Spirit* of *Wine*, and ſet in the Middeſt, and it burnt onely to the ſpace of 87. Pulſes. Mixed with the Sixth Part of a ſpoonefull of *Milke*, it burnt to the ſpace of 100. Pulſes; And the *Milke* was crudled. Mixed with the Sixth Part of a ſpoonefull of *Water*, it burnt to the ſpace of 86. Pulſes; With an *Equall 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. A Peece of *Wood*, of the Bigneſſe of an Arrow, and about a Fingers length, was ſet vp in the Middeſt, and the *Spirit* of *Wine* burnt to the ſpace of 94. Pulſes. So that the *Spirit* of *Wine Simple*, endured 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,

caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Auersion* thereof to take *Flame*: Which will appeare by the Quantitie of the *Spirit* of *Wine*, that remaineth after the Going out of the *Flame*. And it seemeth cleerely 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 goe out of it selfe, will burne 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.

Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolued in the burning, and yet did not incorporate it selfe, with the *Spirit* of *Wine*, to produce one *Flame*; but wheresoeuer the *Wax* floated, the *Flame* forsooke it, till at last it spread all ouer, and put the *Flame* quite out. 368

The *Experiments* of the *Mixtures* of the *Spirit* of *Wine enflamed*, are Things of discouerie, and not of Vse: But now wee will speake of the *Continuance* of *Flames*, such as are vsed for *Candles*, *Lamps*, or *Tapers*; consisting of *Inflammable Matters*, and of a *Wieke* that prouoketh *Inflamation*. And this importeth not only Discouerie, but also Vse and Profit; For it is a great Sauing, in all such Lights, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a Candle, and *Wax Mixed* seuerally into Candle-stuffe, with the Particulars that follow; (viz. *Water*, *Aqua-vitæ*, *Milke*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*,) Euery of these bearing a Sixth Part to the *Wax*; And euery of these *Candles mixed*, being of the same Weight and Wieke with the *Wax Pure*, proued 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 Snaste; But then it made the Snaste bigge, and long, and to burne duskishly, and the *Candle* wasted in halfe 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 selfe. Then the *Bay-Salt*, which lasted about an Eighth part longer than the *Cleare Wax*. Then followed the *Aqua-vitæ*, which lasted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vitæ*, but the *Water* slowest. And in these foure last, the *Wieke* would spit forth little Sparks. For the *Nitre*, it would not hold lighted aboue some Twelue 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 time with the *Nitre*; But then after a little while, it would harden and cake about the Snaste; So that the Mixture of *Bay-Salt* with *Wax*, will winne an Eighth part of the time of lasting, and the *Water* a Fifth. 369

After the Seuerall *Materialls* were tried, Triall was likewise made of seuerall *Wiekes*; As of Ordinary *Cotton*; *Sowing Thred*; *Rush*; *Silke*; *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they 370

they came to the *Wax*, and then goe 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 ſlower 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. *Quare*, whether *Wood*, and *Wiekes* both, as in *Torches*, conſume faſter, than the *Wiekes Simple?*

371 We haue ſpoken of the Seuerall *Materialls*, and the Seuerall *Wiekes*: But to the *laſting* of the *Flame*, it importeth alſo; Not only what the *Material* is, but in the ſame *Material*, whether it be Hard, Soft, Old, New, &c. Good *Houſewines*, to make their *Candles* burne the longer, vſe to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and ſo they Conſume the ſlower: Inſomuch, as by this meanes, they will out-laſt other *Candles*, of the ſame Stuffe, almoſt Halfe in Halfe. For *Bran* and *Flower* haue a Vertue to Harden: So that both Age, and lying in the Bran, doth helpe to the Laſting. And wee ſee that *Wax Candles* laſt longer than *Tallow Candles*, becauſe *Wax* is more firme, and hard.

372 The *Laſting* of *Flame* alſo dependeth vpon the *eaſie Drawing* of the *Nouriſhment*; As we ſee in the *Court* of *England*, there is a Seruice which they call *All-night*; which is (as it were) a great Cake of Wax, with the Wieke in the Middeſt; whereby it commeth to paſſe, that the Wieke fetcheth the Nouriſhment further off. Wee ſee alſo that *Lamps* laſt longer, becauſe the Veſſell is farre broader, than the Bredth of a Taper, or Candle.

373 Take a *Turretted Lampe* of *Tinne*, made in the forme of a Squire; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* ſtandeth: Make only one Hole in it, at the End of the Returne furtheſt from the *Turret*. Reuerſe it, and fill it full of *Oile*, by that Hole; And then ſet it vpright againe; And put a Wieke in at the Hole; And lighten it: You ſhall finde, that it will burne 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 Obſeruation, 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 haue the *Lampe* made, not of *Tinne*, but of *Glaſſe*, that you may ſee how the Vapour, or Aire gathereth, by degrees, in the Top.

374 A fourth Point, that importeth the *laſting* of the *Flame*, is the *Cloſeneſſe* of the *Aire*, wherein the *Flame* burneth. Wee ſee, that if *Wind* bloweth vpon a *Candle*, it waſteth apace. We ſee alſo, it laſteth longer in a *Lanthorne*, than at *large*. And there are Traditions of *Lamps*, and *Candles*, that haue burnt a very long time, in *Caues*, and *Tombes*.

375 A Fifth Point, that importeth the *Laſting* of the *Flame*, is the *Nature* of

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 burne more fiercely; (As Fire scorcheth in Frostie weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceiue) maketh the *Flame* burne 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 wee see *Lights* will goe out in the *Damps* of *Mines*:) And howsoeuer maketh it burne more dully: And so helpeth the *Continuance*.

*Buriall*s in *Earth* serue for *Preseruation*; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may burie the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conseruation*, if the *Bodies* be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preseruation* 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 ouer them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserue them; Except the *Earth* be very Drie, and Sandie. Experiments in Consort touching *Buriall*s or *Infusions* of diuers *Bodies* in *Earth*.

376 An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Forthnights Space, foure Foot deepe within the Earth, though it were in a Moist Place, and a Rainie 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 Iuyce somewhat flatted. But with the *Buriall* of a Forthnight more they became Putrified.

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

378 It were a profitable *Experiment*, to preserue *Orenges*, *Limons*, and *Pomgranates*, till Summer; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessell, well couered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conseruatorie* of *Snow*. And generally, whosoeuer will make *Experiments* of *Cold*, let him be prouided of three Things; A *Conseruatorie* of *Snow*; A good *large Vault*, twenty foot at least vnder the Ground; And a *Deepe Well*.

379 There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that haue lost their Colours, may be recouered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But vpon Triall of Six Weekes *Buriall*, there followed no Effect. It were good to trie it,

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in a *Deepe Well*; Or in a *Conseruatory* of *Snow*, where the Cold may be more Constringent; And so make the *Body* more vnited, and thereby more Respiendent.

Experiment Solitary, touching the *Affects* in *Mens Bodies* from *Southerly Winds*.

381

Mens Bodies are heauier, and lesse disposed to Motion, when *Southerne Winds* blow, than when *Northerne*. The *Cause* is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt, and waxe fluide, and so flow into the Parts; As it is seene in *Wood*, and other *Bodies*; which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Actuity of the Body consisteth chiefly in the Sinewes, which, when the *Southerne Wind* bloweth, are more relaxe.

Experiment Solitary touching *Winter* and *Summer Sicknesses*.

382

It is commonly seene, that more are *Sick* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly raigne 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* commeth on, or is prouoked, more Easily: 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*.

Experiment Solitary touching *Pestilentiall Seasons*.

383

The Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Vpon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there haue beene great *Plagues* in *Dry Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake vp in the *Summer-moneths*, when the *Weather* is *Hot* and *Dry*.

Experiment Solitary, touching an *Error* receiued about *Epidemicall Diseases*.

384

Many *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the *Cause* is falsely imputed to the *Constitution* of the *Aire*, at *that time*, when they *breake forth*, or *raigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Obseruations, of the *Diseases*, that ensue vpon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment Solitary, touching the *Alteration* or *Preseruation* of *Liquours* in *Wells*, or *deepe Vaults*.

385

Triall hath beene made, with *Earthen Bottles* well stopped, hanged in a *Well* of Twenty Fathome deepe, at the least; And some of the *Bottles* haue beene let downe into the *Water*, some others haue hanged aboue, within about a fathome of the *Water*; And the *Liqueurs* so tried haue beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Proofe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as aboue,) haue not beene palled or deaded at all; But as

as good, or somewhat better, than *Bottles* of the same *Drinks*, and Stalenesse, kept in a *Celler*. But those which did hang aboue *Water*, were apparently the best; And that *Beere* did flower a little; whereas that vnder *Water* did not, though it were Fresh. The *Milke* towred, and began to Putrifie. Nauertheleſſe it is true that there is a *Village* neare *Blois*, where in *Deepe Caues* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some *Cause* of this Triall of Hanging *Milke* in the *Well*: But our proofe was naught; Neither doe I know, whether that *Milke* in those *Caues*, be first boyled. It were good therefore to try it with *Milke* Sodden, and with Creame; For that *Milke* of it selfe is such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolued. It were good also to try the *Beere*, when it is in *Wort*, that it may be seene, whether the *Hanging* in the *Well*, will Accelerate the *Ripening* and *Clarifying* of it.

Experiment Solitary, touching *Stutting*

386

Diners, we see, doe *Stut*. The *Cause* may be, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to moue. And therfore we see, that *Naturalls* doe generally *Stut*: And we see that in those that *Stut*, if they drinke Wine moderately, they *Stut* lesse, because it heateth: And so we see, that they that *Stut*, doe *Stut* more in the first Offer to speake, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Drinesse* of the *Tongue*; which likewise maketh it lesse apt to moue, as well as *Cold*; For it is an Affect that commeth to some *Wise* and *Great Men*; As it did vnto *Moses*, who was *Linguæ præpeditæ*; And many *Stutters* (we finde) are very *Cholericke Men*; *Choler* Enducing a *Drinesse* in the *Tongue*.

Experiments in Consort, touching *Smells*.

387

Smells, and other *Odours*, are Sweeter in the Aire, at some Distance, than neare the Nose; As hath beene 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 heare euery Part by it selfe. The other *Reason* is, for that all *Sweet Smells* haue ioyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more Spirituall, is Perceiued; And the *Earthy* reacheth not so farre.

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Sweet Smells are most forcible, in *Dry Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Limons*, the Nipping of their Rinde, giueth out their *Smell* more: And generally, when *Bodies* are *Moued* or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-Bagge waued. 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 Mouing: But in this last, there is a Concurrence of the Second *Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster vpon vs.

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The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaues*

Smell

Smell not; As *Violets, Roses, Wall-flowers, Gilly-flowers, Pinckes, Woodbines, Vine-flowers, Apple-Bloomes, Lime-Tree Bloomes, Beane-Bloomes*, &c. The *Cause* is, for that where there is Heat and strength enough in the *Plant*, to make the *Leaues Odorate*, there the *Smell* of the *Flower* is rather Euanide and Weaker, than that of the *Leaues*; As it is in *Rose-Mary-Flowers, Lauender-Flowers*, and *Sweet-Briar-Roses*. But where there is lesse Heat, there the *Spirit* of the *Plant*, is disgested and refined, and seuered from the Grosser Iuyce, in the *Efflorescence*, and not before.

390 Most *Odours* smell best, *Broken* or *Crusht*, as hath beene said; But *Flowers Pressed* or *Beaten*, doe leese the Freshnesse and Sweetnesse of their *Odour*. The *Cause* is, for that when they are *Crushed*, the Grosser and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in stronger *Odours* there are no such Degrees of the Issue of the *Smell*.

Experiments in Consort touching the *Goodnesse* and *Choice* of *Water*.

It is a Thing of very good Vse, to Discouer the *Goodnesse* of *Waters*. The *Taste*, to those that Drinke *Water* onely, doth somewhat: But other *Experiments* are more sure. First, try *Waters* by *Weight*; Wherein you may finde some difference, though not much: And the *Lighter* you may account the Better.

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

392 Thirdly, try them in *Seuerall Bottles*, or Open Vessells, Matches in euery Thing else, and see which of them *Last Longest*, without *Stench*, or *Corruption*. And that which holdeth Vnputrified longest, you may likewise account the Best.

393 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the same *Quantity* of *Maulc*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nourishing; though perhaps it be not so good for *Medicinall vse*. And such *Water* (commonly) is the *Water* of *Large* and *Nauigable Riuers*: And likewise in *Large* and *Cleane Ponds* of *Standing water*: For vpon both them, the Sunne hath more power, than vpon Fountaines, or Small Riuers. And I conceiue that *Chalke-water* is next them the best, for going furthest in *Drinke*: For that also helpeth *Concoction*; So it be out of a *Deepe Well*; For then it Cureth the Rawnesse of the *Water*; But *Chalkie Water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloaths, which weare out apace, if you vse such *Waters*.

394 Fifthly, The Housewiues doe finde a Difference in *Waters*, for the *Bearing*, or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* best; For the *Hungry water* doth kill the Vnctuous Nature of the *Soape*.

395 Sixthly, you may make a Iudgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Rain-Water* is, by the *Physitians*, esteemed the Finest, and the best; But yet it is said to putrific soonest; which is likely, because of the Finenesse of the Spirit: And in *Conseruatories*,

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ſeruatories of *Raine-water*, (ſuch as they haue in *Venice*, &c.) they are found not ſo Choice *Waters*; The worſe, (perhaps,) becauſe they are Couered aloft, and kept from the Sunne. *Snow-water* is held vnwholeſome; In ſo much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwiſe vpon the Aſcent, (eſpecially the Women,) by drinking of *Snow-water*, haue great Bagges hanging vnder their Throats. *Well-water*, except it be vpon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the beſt: For both they ſeeme to haue a Lightneſſe, and Apperite of Mounting; And beſides they are moſt pure and Vnmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleyes*, ioyne in effect vnder Ground with all *Waters* of the ſame Leuell; Whereas *Springs*, on the *Tops* of *Hills*, paſſe thorow a great deale of Pure *Earth*, with leſſe Mixture of other *Waters*.

Seuenthly, Iudgement may be made of *Waters* by the *Soyle whereupon the Water runneth*; As *Pebble* is the Cleaneſt, and beſt taſted; And next to that *Clay-water*; And Thirdly, *Water* vpon *Chalke*; Fourthly, that vpon *Sand*; And Worſt of all vpon *Mudde*. 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 deale of Filth. 397

In *Peru*, and diuers Parts of the *Weſt Indies*, though vnder 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 Aire in great Circles, (ſuch as are vnder the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in thoſe Parts Noone is nothing ſo hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cauſe* is, for that the Length of the Night, and the Dewes thereof, doe compenſe the *Heat* of the Day. A third *Cauſe* is the Stay of the Sunne; Not in Reſpect of Day and Night, (for that wee ſpake of before,) but in Reſpect of the Seaſon; For vnder the *Line*, the Sunne croſſeth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth backe againe, and ſo maketh one Long Summer. Experiment Solitary, touching the *Temperate Heat* vnder the *Æquinoctiall*. 398

The *Heat* of the *Sunne* maketh *Men Blacke* in ſome Countries, as in *Æthiopia*, and *Ginny*, &c. *Fire* doth it not, as wee ſee in *Glaſſe-Men*, that are continually about the *Fire*. The *Reaſon* may be, becauſe *Fire* doth licke vp the *Spirits*, and Bloud of the Body, ſo as they Exhale; So that it euer maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud to Experiment Solitary, touching the *Coloration* of *Blacke* and *Tawney Moores*. 399

to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore wee ſee that all *Æthiopes* are Fleſhy, and Plumpe, and haue great Lips; All which betoken *Moiſture* retained, and not drawne out. Wee ſee alſo, that the *Negroes* are bred in Countries that haue Plenty of *Water*, by *Riuers*, or otherwiſe: For *Meroë*, which was the *Metropolis* of *Æthiopia*, was vpon a great Lake: And *Congo*, where the *Negroes* are, is full of Riuers. And the Confines of the Riuer *Niger*, where the *Negroes* alſo are, are well watered: And the Region about *Capo Verde*, is likewiſe Moiſt, in ſo much as it is peſtilent through Moiſture: But the Countries of the *Abyſſenes*, and *Barbary*, and *Peru*, where they are Tawney, and Oliuaſter, and Pale, are generally more Sandy, and Dry. As for the *Æthiopes*, as they are Plumpe, and Fleſhy; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skinne would ſuffer it to be ſeene.

Experiment Solitary touching *Motion* after the *Inſtant* of *Death*.

400 Some *Creatures* doe moue a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beaſts; Some moue, though cut in ſeuerall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. Firſt therefore it is certaine, 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 beene ſcuered; And it is a Report alſo of Credit, that the *Head* of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or ſeuering it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, ſtarke dead, and without Motion; And after a ſmall Time the Braine hath beene replaced, and the Skull of the *Pigge* cloſed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* vpon *Reuenge* hath beene thruſt forth, ſo as it hanged a pretty diſtance by the *Viſuall Nerue*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recouered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beaſts* are Large; And therefore, when the *Head* is off, they moue little or Nothing. But *Birds* haue ſmall *Heads*, and therefore the *Spirits* are a little more diſperſed in the *Sinewes*, whereby Motion remaineth in them a little longer; In ſo much as it is Extant in Story, that an *Emperour* of *Rome*, to ſhew the Certainty of his Hand, did Shoote a great Forked Arrow at an *Eſtrich*, as ſhee ranne ſwiftly vpon the Stage, and ſtrooke off her Head;

And

And yet ſhee continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffuſed almoſt all ouer; And therefore they moue in their Seuerall Pieces.

P NATV-

NATVRALL HISTORIE.

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 Vſe, for Food, Medicine, and a Number of Mechanicall Arts.

Experiments in Conſort, touching the *Acceleration* of *Germination*.

There were ſowen in a *Bed*, *Turnip-Seed*, *Radiſh-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 vpon a Banke, halfe a foot high, and ſupported round about with Planks ; And vpon the Top was caſt Sifted Earth, ſome two Fingers deepe ; And then the *Seed* ſprinkled vpon it, hauing beene ſteeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came vp halfe an Inch aboue Ground, within two dayes after, without any Watring. The Reſt the third day. The *Experiment* was made in *October* ; And (it may be) in the *Spring*, the *Accelerating* would haue beene the ſpeedier. This is a Noble *Experiment* ; For without this helpe, they would haue 401

beene foure times as long in comming vp. But there doth not occurre to me, at this present, any vse thereof, for profit; Except it should be for Sowing of *Pease*; which haue their Price very much increased, by the early Comming. It may be tried also with *Cherries*, *Strawberries*, and other Fruit, which are dearest, when they come early.

402 There was *Wheat*, steeped in *Water* mixed with *Cow-Dung*; Other in *Water* mixed with *Horse-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Vrine* of *Man*; Other in *Water* mixed with *Chalke* powdred; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Ashes*; Other in *Water* 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*; Saue that there was not of the *Salt* aboue an eighth Part. The *Vrine*, and *Wines*, and *Spirit* of *Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelue houres. The Time of the Yeare *October*. There was also other *Wheat* sowen *vnsteeped*, but *watred* twice a day with *Warme water*. There was also other *Wheat* sowen *Simple* to compare it with the rest. The Euent was; That those that were in the Mixture of *Dung*, and *Vrine*, and *Soot*, *Chalke*, *Ashes*, and *Salt*, came vp within six dayes: And those that afterwards proued the Highest, Thickest, and most Lustie, were; First the *Vrine*; And then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Ashes*; Next the *Salt*; Next the *Wheat Simple* of it selfe, vnsteeped, and vnwatered; Next the *Watered twice a day* with warme water; Next the *Claret Wine*. So that these three last were slower than the ordinary *Wheat* of it selfe; And this Culture did rather retard, than aduance. As for those that were steeped in *Malmsey*, and *Spirit* of *Wine*, they came not vp at all. This is a Rich *Experiment* for Profit; For the most of the Steepings are Cheape Things; And the Goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming vp: As it is like it will; Both being from the vigour of the *Seed*; Which also partly appeared in the Former *Experiments*, as hath beene said. This *Experiment* would be tried in other *Graines*, *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 *Seuerall Seasons* of the *Yeare*, especially the *Spring*.

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

404 *Dung*, or *Chalke*, or *Bloud*, applied in Substance, (seasonably,) to the

Roots

Roots of Trees, doth set them forwards. But to doe it vnto *Herbs*, without Mixture of *Water* or *Earth*, it may be these Helpes are too Hot.

The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* 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 kinde, 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 warme* vpon a *Wall*, against the South, or South-East Sunne, doth hasten their Comming 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 chiefly, 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 the *Planting* of them vpon the *Backe* of a *Chimney*, where a *Fire* is kept, doth hasten their Comming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a Fire is continually kept, worketh the same Effect; Which hath beene tried with Grapes; In so much as they will come a Moneth earlier, than the Grapes abroad. 405

Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Remouing Herbs* and *Flowers* into new Earth, once in two yeares, (which is the same thing, For the new Earth is euer looser,) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*. 406

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske* Rose with the *Root* on, was set in a Chamber, where no Fire was, vpright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot vnder the *Water*, the *Standard* being more then two foot high aboue the *Water*: Within the Space of ten dayes, the *Standard* did put forth a faire Greene leafe, and some other little Buds, which stood at a stay, without any Shew of decay or withering, more then seuen Daies. But afterwards that Leafe faded, but the young Buds did sprout on; which afterward opened into faire Leaues, in the space of three Moneths; And continued so a while after, till vpon Remouall we left the Triall. But note that the *Leaues* were somewhat paler, and lighter-coloured, than the *Leaues* vse to be abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would haue put forth with greater strength, and (it may be) to haue growne on to beare Flowers. By this Meanes, you may haue, (as it seemeth,) *Roses* set in the middest of a *Poole*, being supported with some stay; Which is Matter of Rarenesse and Pleasure, though of small Vse. This is the more strange, 407

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 foure Moneths ſpace (while it was obſerued) put not forth any *Leaſe*, though diuers *Buds* at the firſt, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewiſe put, at the ſame time, all vnder *Water*, ſome two or three Fingers deepe; And within ſeuen 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 al their *Leaues* cut almoſt cloſe to the *Roots*; And within ſix weekes had faire *Leaues*; And ſo continued, till the end of *Nouember*.

409 Note that if *Roots*, or *Peaſe*, or *Flowers*, may be *Accelerated* in their *Comming* 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 *Swiftneſſe* of their *Returnes*: For in ſome Grounds which are ſtrong, you ſhall haue a *Raddiſh*, &c. come in a Month; That in other Grounds will not come in two; And ſo make double *Returnes*.

410 *Wheat* alſo was put into the *Water*, and came not forth at all; So as it ſeemeth there muſt be ſome Strength and Bulke 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 vnder the Pan, which was ſomewhat moiſtned by the Suing of the Pan; which in ſix weekes (as aforeſaid) looked mouldy to the Eye, but it was ſprouted forth halfe a Fingers length.

411 It ſeemeth by theſe *Inſtances* of *Water*, that for Nouriſhment, the *Water* is almoſt all in all, and that the *Earth* doth but keepe the *Plant* vpright, and ſaue it from Ouer-heat, and Ouer-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proueth alſo that our former *Opinion*; That Drinke incorporate with Fleſh, or Roots, (as in *Capon-Beere*, &c.) will nouriſh more eaſily, than Meat and Drinke taken ſeuerally.

412 The *Houſing* of *Plants* (I conceiue) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seaſons*: And as wee *Houſe Hot-Countrey Plants*, as *Limons*, *Orenges*, *Myrtles*, to ſaue them; So we may *Houſe* our owne *Countrey Plants*, to forward them, and make them come in the Cold Seaſons; In ſuch ſort, that you may haue *Violets*, *Strawberries*, *Peaſe*, all Winter: So that you ſow, or remoue them at fit times. This *Experiment* is to be referred vnto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Houſing* their *Boughes*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments in Conſort, touching the *Putting backe* 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 *Nouember-Roſe* is the ſweeteſt, hauing beene leſſe exhaled by the Sunne. The Meanes are theſe. Firſt, the *Cutting off their Tops*, immediately after they haue done Bearing; And then they will come againe the

the ſame yeare about *November*: But they will not come iuſt on the Tops, where they were cut, but out of thoſe Shoots, which were, (as it were,) *Water-Boughes*. The *Cauſe* is, for that the Sap, which otherwiſe would haue fed the Top, (though after Bearing,) will, by the diſcharge of that, diuert vnto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Roſe*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cauſe* is the ſame with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the ſame Effect, in Retention of the Sap for a time, and Diuerſion of it to the Sprouts, that were not ſo forward. 414

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 doe helpe to draw vp the Sap more ſtrongly; And we ſee that in Powling of Trees, many doe vſe to leaue a Bough or two on the Top, to helpe to draw vp the Sap. And it is reported alſo, that if you graft vpon the Bough of a Tree, and cut off ſome of the old Boughes, the new Cions will periſh. 415

The Fourth is by *Laying the Roots bare about Chriſtmas*, ſome dayes. The *Cauſe* is plaine, for that it doth arreſt the Sap, from going vpwards, for a time; Which Arreſt is afterwards releaſed by the Couering of the Root againe with Earth; And then the Sap getteth vp, but later. 416

The Fifth is the *Remouing* of the *Tree*, ſome Moneth before it *Buddeth*. The *Cauſe* is, for that ſome time will be required after the *Remoue*, for the Reſetling, before it can draw the Iuyce: And that time being loſt, the Bloſſome muſt needs come forth later. 417

The Sixth is the *Grafting* of *Roſes* in *May*, which commonly Gardiners doe not till *Iuly*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the ſame yeare, but late. 418

The Seuenth is, the *Girding* of the *Body* of the *Tree* about with ſome Pack-threed; For that alſo, in a degree, reſtraineth the Sap, and maketh it come vp, more late, and more Slowly. 419

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 Nourihment, by the Stuffe in the *Hedge*. Theſe Meanes may be practiſed vpon other, both Trees, and Flowers, *Mutatis Mutandis*. 420

Men haue entertained a Conceit that ſheweth prettily; Namely, that if you graft a *Late-Comming Fruit*, vpon a Stocke of a *Fruit-tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach vpon a Cherry; And contrariwiſe, if an *Early-Comming-Fruit* vpon a Stocke of a *Fruit-Tree* that *Commeth late*, the Graft will beare Fruit late; As a Cherry vpon a Peach. But theſe are but Imaginations, and vntrue. The *Cauſe* is, for that the Cions ouerruleth the Stocke quite; And the Stocke is but Paſſiue onely, and giueth Aliment, but no Motion to the Graft. 421

We

Experiments in Consort touching the *Melioration* of *Fruits, Trees,* and *Plants.*

We will ſpeake now, how to make *Fruits, Flowers,* and *Roots* larger; in more plenty; and ſweeter; than they vſe to be; And how to make the *Trees* themſelues, more Tall; more Spread; and more Haſty and Sudden; than they vſe to be. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will ſerue much to theſe Purpoſes. And againe, that theſe *Experiments*, which we ſhall now ſet downe, doe ſerue alſo for *Acceleration*; becauſe both Effects proceed from the Encreaſe of vigour in the Tree; But yet to auoid Confuſion; And becauſe ſome of the Meanes are more proper for the one Effect, and ſome for the other, wee will handle them apart.

422 It is an aſſured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottome* of a *Wilde-Tree*, (as an Oake, Elme, Aſh, &c.) vpon 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 vpon the *Tree*, and ſuffereth it not to be exhaled by the Sunne. Againe, it keepeth the Tree warme, 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 giueth the Sap, yet it is the Body that draweth it. But you muſt note, that if you lay *Stones* about the ſtalke of Lettuce, or other Plants, that are more ſoft, it will ouer-moiſten the Roots, ſo as the Wormes will eat them.

423 A *Tree*, at the firſt *Setting*, ſhould not be *Shaken*, vntill it hath *taken Root fully:* And therefore ſome haue put two little Forkes about the Bottome of their *Trees*, to keepe them vpright; But after a yeares 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*.

424 Generally, the *Cutting away* of *Boughes* 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 wee ſee in *Pollards*, &c.

425 It is reported, that to make *haſty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of ſome ſeuen yeares growth; And to ſet them, not vpright, but a-ſlope, a reaſonable depth vnder the Ground; And then, in ſtead of one Root, they will put forth many, and ſo carry more Shoots vpon a Stemme.

426 When you would haue *many new Roots* of *Fruit-trees*, take a *Low Tree*, and bow it, and lay all his Branches a-flat vpon the Ground, and caſt Earth vpon them; And euery Twigge will take Root. And this is a very profitable *Experiment* for Coſtly *Trees*; (for the Boughes will make Stockes

Stockes without charge;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs*, &c. The like is continually practised with *Vines, Roses, Musee-Roses*, &c.

From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches, and couer the bare Place, somewhat aboue, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the Bough about *Alhallontide* in the bare place, and set it in the Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cause* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from descending towards Winter, and so holdeth it in the Bough; And it may be also that the Loame and Horse-Dung applied to the bare place, doe 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 vp the Sap of *Trees* in their Boughes; Which may serue to other Effects. 427

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

It hath beene practised in *Trees*, that doe not beare, to cleaue two or three of the Chiefe Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The *Cause* may be, for that a Root of a Tree may be (as it were,) Hide-bound, no lesse than the Body of the Tree; But it will not keepe open without somewhat put into it. 429

It is vsually practised, to set *Trees* that require much *Sunne*, vpon *Walls* against the *South*; As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double Commodity; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the vpper Boughes ouer-shadow the lower; But when it is spread vpon a Wall, the Sunne commeth alike, vpon the vpper, and lower Branches. 430

It hath also beene practised (by some) to pull off some *Leaues* from the *Trees to spread*, that the Sunne may come vpon the *Bough* and *Fruit* the better. There hath beene practised also a Curiosity, to set a *Tree* vpon the *North-Side* of a Wall, and at a little height, to draw him thorow the Wall, and spread him vpon the *South-Side:* Conceiuing that the Root and lower Part of the Stocke should enioy the Freshnesse of the Shade; And the Vpper Boughes, 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 vnder Earth, as well as the *Body:* And the Lower Part of the Body more than the Vpper, as wee see in Compassing a *Tree* below with Straw. 431

The *Lownesse* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you shall euer see in *Apricots*, 432

Peaches, or *Melo-Cotones*, vpon a wall, the greatest Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow vpon low Vines, bound to small Stakes. And the raised Vines in Arbours make but Veriuyce. It is true, that in *Italy*, and other *Countries*, where they haue hotter Sunne, they raise them vpon *Elmes*, and Trees; But I conceiue, that if the *French* Manner of Planting low, were brought in vse there, 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 neare the Ground, and the lower boughes onely maintained, and the higher continually proined off, would not make a larger *Fruit*.

433 To haue *Fruit* in *Greater Plenty*, the way is, to graft, not onely vpon young *Stockes*, but vpon diuers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but vpon one Stocke, the *Tree* can beare but few.

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

435 It hath beene knowne, that a *Fruit-Tree* hath beene blowne vp (almost) by the Roots, and set vp againe, and the next yeare 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 remoued into New Grounds, as *Flowers* and *Herbs* may.

436 To reuiue 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 beene vsed, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former.

437 If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be troden and beaten downe 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 vp in the Plant, stayeth longer in the Root, and so dilateth it. And *Gardiners* vse to tread downe any loose Ground, after they haue sowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottome of a *Root*, it will cause the Root to grow to an Excessiue Bignesse. The *Cause* is, for that being it selfe of a Spungy Substance, it draweth the Moisture of the Earth to it, and so feedeth the Root. This is of greatest vse for *Onions*, *Turnips*, *Parsnips*, and *Carrets*.

439 The *Shifting* of *Ground* is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things doe prosper best, when they are aduanced to the better: Your *Nursery* of *Stockes* ought to be in a more

Barren

Barren Ground, than the Ground is whereunto you remoue them. So all *Graziers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it leaueth a Cherishing to the better, of the Body, in Age: Nay in Exercises, it is good to begin with the hardest, as Dancing in Thicke Shooes, &c.

It hath beene obserued, that *Hacking* of *Trees* in their *Barke*, both downe-right, and acrosse, so as you make them rather in slices, than in continued Hacks, doth great good to *Trees*; And especially deliueteth them from being *Hide-bound*, and killeth their Mosse. 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 *Borrage-Seed*; And you shall finde the *Strawberries* vnder those Leaues farre more large than their Fellowes. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the *Weed* giueth them *Shade*. 441

To increase the *Crops* of *Plants*, there would be considered, not only the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the Sauing also of that which is spilt. So they haue lately made a Triall, to *Set Wheat*; which neuertheless hath beene left off, because of the trouble and paines; Yet so much is true, that there is much saued by the *Setting*, in comparison of that which is *Sowen*; Both by keeping it from being picked vp by Birds; And by Auoiding the Shallow lying of it, whereby much that is sowen taketh no Root. 442

It is prescribed by some of the *Ancients*, that you take *Small Trees*, vpon which *Figs* or other *Fruit* grow, being yet vnripe, and couer the *Trees* in the Middle of *Autumne* with dung, vntill the Spring; And then take them vp in a warme day, and replant them in good Ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the same kinde, doe but blossome. But this seemeth to haue no great Probabilitie. 443

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thicknesse 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*. 444

Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come vp much earlier than in the *Earth* it selfe. This I conceiue to be as a Kinde of *Grafting* in the *Root*; For as the Stocke 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 445

the like; Saue 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 seuerall places, when it is almost at his Bigness, and before it ripeneth, hath beene practised with successe, to ripen the Fruit more suddenly. Wee see the Example of the *Biting* of *Wasps*, or *Wormes*, vpon *Fruit*, whereby it (manifestly) ripeneth the sooner.

447 It is reported, that *Alga Marina (Sea-weed)* put vnder the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertilitie.

448 It hath beene practised, to cut off the Stalkes of *Cucumbers*, immediately after their *Bearing*, close by the Earth; And then to cast a prettie Quantitie of Earth vpon the *Plant* that remaineth; and they will beare the next yeare Fruit, long before the ordinary time. The *Cause* may be, for that the Sap goeth downe the sooner, and is not spent in the Stalke or Leafe, which remaineth after the Fruit. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annuall*, seemeth to be partly caused by the Ouer-Expence of the Sap into Stalke, and Leaues; which being preuented, they will super-annate, if they stand warme.

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

450 It were good to trie, what would be the Effect, if all the *Blossomes* were pulled from a *Fruit-Tree*; Or the *Acornes* and *Chesnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I suppose that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit*; Or else, the same yeares, larger Leaues, because of the Sap stored vp.

451 It hath beene generally receiued, that a *Plant watered* with *Warme Water*, will come vp sooner and better, than with Cold Water, or with Showers. But our *Experiment* of *Watering Wheat* with *Warme Water* (as hath beene said) succeeded not; which may be, because the Triall was too late in the Yeare, *viz.* in the End of *October*. For the Cold then comming vpon the *Seed*, after it was made more tender by the Warme Water, might checke it.

452 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 *Stocke*, than in the *Crude Earth*: But yet note well, that there be some *Trees*, that are said to come vp 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 *Stocke* be finer, and

and better prepared, yet it is not ſo moiſt, and plentifull, as the Nourihment of the *Earth*. And indeed we ſee thoſe *Fruits* are very Cold *Fruits* in their Nature.

It hath beene receiued, that a Smaller *Peare*, grafted vpon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* vpon the *Late Stocke*; And *è conuerſo*; which we reiected before: For the *Cions* will gouerne. Neuertheleſſe it is probable enough, that if you can get a *Cions* to grow vpon a *Stocke* of another kinde, that is much moiſter than his owne *Stocke*, it may make the *Fruit* Greater, becauſe it will yeeld more plentifull nourihment; Though it is like it will make the *Fruit* Baſer. But generally, the *Grafting* is vpon a dryer *Stock*; As the *Apple* vpon a *Crab*; The *Peare* vpon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* vpon the *Stocke* of a *Colewort*, and it will beare a great flaggy *Apple*; The *Kernell* of which, if it be ſet, will be a *Colewort*, and not an *Apple*. It were good to try, whether an *Apple-Cions* will proſper, if it be grafted vpon a *Sallow*, or vpon a *Poplar*, or vpon an *Alder*, or vpon an *Elme*, or vpon an *Horſe-Plumme*, which are the moiſteſt of *Trees*. I haue heard that it hath beene tryed vpon an *Elme*, and ſucceeded. 453

It is manifeſt by Experience, that *Flowers* Remoued wax greater, becauſe the Nourihment is more eaſily come by, in the looſe Earth. It may be, that Oft Regrafting of the ſame Cions, may likewiſe make *Fruit* greater; As if you take a *Cions*, and graft it vpon a *Stocke* the firſt yeare; And then cut it off, and graft it vpon another *Stocke* the ſecond yeare; and ſo for a third; Or fourth yeare; 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 reſerue to a proper Place.*

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaues, haue his Top cut off. The *Cauſe* is plaine, for that the Sap hath the leſſe to feed, and the leſſe way to mount: But it may be, the *Figge* 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 *Truncke* of the *Tree* thorow, in ſeuerall places, and thruſt into the Places bored, Wedges of ſome Hot *Trees*, as *Turpentine*, *Maſtick-Tree*, *Guaiacum*, *Iuniper*, &c. The *Cauſe* may be, for that Aduentiue Heat doth cheare vp the Natiue Iuyce of the *Tree*. 456

It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Sale*, or *Lees* of *Wine*, or *Bloud* to the *Root*. The *Cauſe* may be the Encreaſing the Luſt or Spirit of the *Root*; Theſe Things being more forcible, than ordinary *Compoſts*. 457

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

Herbs

459 *Herbes* will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come vp, and remoue them into *Pots*, with better *Earth*. The Remoue from *Bed* to *Bed* was ſpoken of before; But that was in ſeuerall yeares; This is vpon the ſudden. The *Cauſe* is the ſame with other *Remoues*, 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 leſſe Adurent than *Salt*.

461 It is reported, that *Cucumbers* will proue more Tender, and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cauſe* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the groſſer Iuyce of the Earth, but onely the finer. The ſame *Experiment* may be made in *Artichoakes*, and other *Seeds*, when you would take away, either their Flaſhineſſe, or Bitterneſſe. They ſpeake 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 quicke a Spirit.

462 It is reported that *Cucumbers* will be leſſe *Watry*, and more *Melon-like*, if in the Pit where you ſet them, you fill it (halfe way vp) with *Chaffe*, or ſmall *Stickes*, and then powre *Earth* vpon them; For *Cucumbers*, as it ſeemeth, doe extremely affect Moiſture; And ouer-drinke themſelues; Which this *Choffe*, or *Chips*, forbiddeth. Nay it is further reported, that if when a *Cucumber* is growne, you ſet a Pot of water about fiue 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 diſcouereth *Perception* in *Plants*, to moue towards that which ſhould helpe 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 farre ſtranger (as is ſaid) than the other; For that *Water* may worke by a *Sympathy* of *Attraction:* But this of the *Stake* ſeemeth to be a Reaſonable Diſcourſe.

463 It hath beene 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 receiue Aliment ſufficient; And yet no more than they can well turne, and diſgeſt; And withall doe ſweat out the courſeſt and vnprofitableſt Iuyce; Euen as it is in *Liuing Creatures*, which by Moderate Feeding, and Exerciſe, and Sweat, attaine the ſoundeſt Habite of Body.

464 As *Terebration* doth *Meliorate Fruit*, ſo, vpon the like reaſon, doth *Letting of Plants Blood*; As *Pricking Vines*, or other *Trees*, after they be of ſome Growth; And thereby letting forth *Gumme*, or *Teares*; 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* haue beene turned into *Sweet*.

The

The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-Dung* aboue all other *Dung*; Which may be, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony; For wee see *Swines* and *Figges* Flesh is the Moistest of Fleshes. 465

It is obserued by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be growne vp some reasonable time, they be cut, and so you take the latter Sprout. The *Cause* may be, for that the longer the Iuyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaues*, is the Length of time, in which they grow to *Maturation*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing. 466

As *Grafting* doth generally aduance and *Meliorate Fruits*, aboue that which they would be, if they were set of *Kernells*, or *Stones*, in regard the *Nourishment* is better concocted; So (no doubt) euen in *Grafting*, for the same cause, the Choise of the *Stocke* doth much; Alwayes prouided, that it be somewhat inferiour to the *Cions*: For otherwise it dulleth it. They commend much the *Grafting* of *Peares*, or *Apples*, vpon a *Quince*. 467

Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tryed, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (especially laid vp together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*. 468

It is deliuered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twenty dayes, and then set againe; And yet more, if the outermost Pill be taken off all ouer. 469

It is deliuered by some, that if one take the *Bough* of a *Low Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the bottome to let in the *Plant*, and then Couer the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Remouing, and Leauing the *Fruit* in the Earth. The like, (they say,) will be effected, by an Empty *Pot* without Earth in it, put ouer a *Fruit*, being propped vp with a *Stake*, as it hangeth vpon 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 giue a reason, that the *Fruit*, Louing and Coueting the open Aire and Sunne, is inuited by those Pertusions, to spread and approch, as neare the open Aire, as it can; And so enlargeth in *Magnitude*. 470

All *Trees*, in *High* and *Sandy Grounds*, are to be set deepe; And in *Watry Grounds*, more shallow. And in all *Trees*, when they be remoued (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 471

seemeth to haue lesse reason; Because the *Stone* lyeth not so neare the Sunne, as the *Tree* groweth.

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

473 It is said, that if *Potado 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 Hauing 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 Thicknesse. And it may be, that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

474 The *Cutting off* the *Leaues* of *Radish*, or other *Roots*, in the beginning of Winter, before they wither; And Couering againe the *Root*, something high with Earth; Will preserue the *Root* all Winter, and make it bigger, in the Spring following, as hath beene partly touched before. So that there is a double Vse of this *Cutting off* the *Leaues*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthning the *Root*, it will make the *Fruit* also the greater.

475 It is an *Experiment* of great pleasure, to make the *Leaues* of *Shady Trees*, larger than ordinary. It hath beene tryed (for certaine) that a *Cions* of a *Weech-Elme*, grafted vpon the Stocke of an Ordinary *Elme*, will put forth Leaues, almost as broad as the Brimme of ones Hat. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaues*. It would be tryed therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the Leafe.

476 The *Barrennesse* of *Trees*, by *Accident*, (besides the *Weaknesse* of the *Soile*, *Seed*, or Root; And the *Iniury* of the *Weather*) commeth either of their *Ouer-growing* with *Mosse*, Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much into the Leaues*. For all these there are *Remedies* mentioned before.

Experiments in Consort touching *Compound Fruits* and *Flowers*.

Wee see that in *Liuing Creatures*, that haue *Male* and *Female*, there is Copulation of seuerall Kindes; And so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Asse*; And some other *Compounds*, which we call *Monsters*,

ſters, though more rare : And it is held, that that *Prouerbe*, *Africa ſemper aliquid Monſtri parit* ; commeth, for that the Fountaines of Waters there, being rare, diuers Sorts of Beaſts come from ſeuerall Parts to drinke ; And ſo being refreſhed, fall to couple, and many times with ſeuerall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out ; Which neuertheleſſe, if it be poſſible, is more at command, than that of *liuing Creatures* ; For that their Luſt requireth a voluntary Motion : wherefore it were One of the moſt Noble *Experiments* touching *Plants*, to finde it out : For ſo you may haue great Varietie of New *Fruits*, and *Flowers* yet vnknowne. *Grafting* doth it not : That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* euer ouer-ruleth the *Stocke*.

It hath beene ſet downe by one of the *Ancients*, that if you take two *Twigs* of ſeuerall *Fruit Trees*, and flat them on the Sides, and then binde them cloſe together, and ſet them in the ground, they will come vp in one Stocke; But yet they will put forth their ſeuerall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnitie* of *Continuance*, is eaſier to procure, than *Vnitie* of *Species*. It is reported alſo, that *Vines* of *Red* and *White Grapes*, being ſet in the Ground, and the vpper Parts being flatted, and bound cloſe together, will put forth *Grapes* of the ſeuerall Colours, vpon the ſame Branch ; And *Grape-Stones* of ſeuerall Colours within the ſame *Grape* : But the more, after a yeare or two ; The Vnitie (as it ſeemeth) growing more Perfect. And this will likewiſe helpe, if from the firſt *Vniting*, they be often Watred ; For all Moiſture helpeth to *Vnion*. And it is preſcribed alſo, to binde the *Bud*, as ſoone as it commeth forth, as well as the *Stocke* ; At the leaſt for a time. 477

They report, that diuers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put vp *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. 478

It is reported, that young *Trees* of ſeuerall kindes, ſet contiguous, without any binding, and very often Watred, in a *Fruitfull Ground*, with the very Luxurie of the *Trees*, will incorporate, and grow together. Which ſeemeth to me the likelieſt Meanes, that hath beene propounded ; For that the *Binding* doth hinder the Naturall Swelling of the *Tree* ; which, while it is in Motion, doth better *vnite*. 479

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

There are many Ancient and Receiued Traditions and Obſeruations, touching the *Sympathy* and *Antipathy* of *Plants*:

For that ſome will thriue beſt growing neere 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 concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any ſuch Secret *Friendſhip*, or *Hatred*, as they imagine ; And if we ſhould be content to call it *Sympathy*, and *Antipathy*, it is vtterly miſtaken ; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus ; Wherefoeuer one *Plant* draweth ſuch a particular Iuyce out of the Earth ; as it qualifieth the Earth ; So as that Iuyce which remaineth is fit for the other Plant, there the Neighbourhood doth good ; Becauſe the Nouriſhments are contrary, or ſeuerall : But where two *Plants* draw (much) the ſame Iuyce, there the Neighbourhood hurteth ; For the one deceiueth the other.

480 Firſt therfore, all *Plants* that doe draw much *Nouriſhment* from the *Earth*, and ſo ſoake the Earth, and exhauſt it ; hurt all Things that grow by them ; As Great *Trees*, (eſpecially *Aſhes*,) and ſuch *Trees*, as ſpread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently receiued) to the *Vine* only ; But it is an Enemy to any other *Plant* ; Becauſe it draweth ſtrongly the fatteſt Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne 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.

481 Where *Plants* are of ſeuerall Natures, and draw ſeuerall Iuyces out of the Earth, there (as hath beene ſaid) the One ſet by the other helpeth : As it is ſet downe by diuers of the Ancients, that *Rew* doth proſper much, and becommeth ſtronger, if it be ſet by a *Figge-Tree* : which (we conceiue) is cauſed, Not by Reaſon of *Friendſhip*, but by *Extraction* of a Contrary Iuyce : The one Drawing *Iuyce* fit to reſult Sweet, the other bitter. So they haue ſet downe likewiſe, that a *Roſe* ſet by *Garlicke* is ſweeter : Which likewiſe may be, becauſe the more Fetide Iuyce of the Earth goeth into the *Garlicke* ; And the more Odorate into the *Roſe*.

482 This wee ſee manifeſtly, that there be certaine *Corne-Flowers*, which come ſeldome or neuer in other places, vnleſſe they be ſet ; But onely amongſt Corne : As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitorie*. 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 vnſowne, they will not come : So as it ſhould ſeeme to be the *Corne*, that

that qualifieth the Earth, and prepareth it for their Growth.

This Obſeruation, if it holdeth, (as it is very probable,) is of great vſe, for the *Meliorating* of *Taſte* in *Fruits*, and *Eſculent Herbs*; And of the *Sent* of *Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more ſtrong, and bitter, (as the Ancients haue noted,) good ſtore of *Rew* planted about the *Figge-Tree*, will make the *Figge* more ſweet. Now the *Taſtes* that doe moſt offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*; *Harriſh*; *Sowre*; And *Watriſh*, or *Flaſhy*. It were good therefore to make the *Trials* following. 483

Take *Wormewood*, or *Rew*, and ſet it neere *Lettuce*, or *Coleflory*, or *Artichoake*; And ſee whether the *Lettuce*, or the *Coleflory*, &c. become not the ſweeter. 484

Take a *Seruice-Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which wee know haue *Fruits* of harſh and binding Iuyce, and ſet them neere a *Vine*, or *Figge-Tree*, and ſee whether the *Grapes*, or *Figs*, will not be the ſweeter. 485

Take *Cucumbers*, or *Pumpions*, and ſet them (here and there) amongſt *Muske-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. 486

Take *Sorrell*, and ſet it amongſt *Raſps*, and ſee whether the *Raſps* will not be the ſweeter. 487

Take *Commen Briar*, and ſet it amongſt *Violets*, or *Wall-Flowers*, and ſee whether it will not make the *Violets*, or *Wall-Flowers* ſweeter, and leſſe 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. 488

Contrariwiſe, you muſt take heed, how you ſet *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Roſemary* will leeſe in Sweetneſſe, if it be ſet with *Lauender*, or *Bayes*, or the like. But yet, if you will correct the ſtrength of an Herbe, you ſhall doe well to ſet other like Herbs by him, to take him downe; As if you ſhould ſet *Tanſey* 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 Wormewood*, it may be, the *Wormewood* would turne to be liker *Roman Wormewood*. 489

This *Axiome* is of large extent; And therefore would be ſcuered, and refined by *Triall*. Neither muſt you expect to haue a *Groſſe Difference* by this kinde of Culture, but only *Further Perfection*. 490

Triall would be alſo made in *Herbs Poiſonous*, and *Purgatiue*, whoſe ill Qualitie (perhaps) may be diſcharged, or attempred, by Setting ſtronger *Poiſons*, or *Purgatiues*, by them. 491

It is reported, that the *Shrub* called *Our Ladies Seale*, (which is a Kinde of *Briony*,) and *Coleworts*, ſet neere together, one of both will die. The *Cauſe* is, for that they be both great Depredatours of the Earth, and one of them ſtarueth the other. The like is ſaid of a *Reed*, and a *Brake*; Both which are ſucculent; And therefore the One de- 492

ceiueth the Other. And the like of *Hemlocke* and *Rew*; Both which draw ſtrong Iuyces.

493 Some of the Ancients, and likewiſe diuers of the Moderne Writers, that haue laboured in *Naturall Magicke*, haue noted a *Sympathy*, between the *Sunne*, *Moone*, and ſome Principall *Starres*; And certaine *Herbs*, and *Plants*. And ſo they haue denominated ſome *Herbs Solar*, and ſome *Lunar*; And ſuch like Toyes put into great Words. It is manifeſt, that there are ſome *Flowers*, that haue *Reſpect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed moſt *Flowers*, doe open or ſpread their Leaues abroad, when the *Sunne* ſhineth ſerene and faire: And againe, (in ſome part,) cloſe them, or gather them inward, either towards Night, or when the Skie is ouercaſt. Of this there needeth no ſuch Solemne Reaſon to be aſſigned; As to ſay, that they reioyce at the preſence of the Sunne; And mourne at the Abſence thereof. For it is Nothing elſe, but a little Loading of the Leaues, and Swelling them at the Bottome, with the Moiſture of the Aire; whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Clauer* will hide the *Stalke*, when the *Sunne* ſheweth bright; Which is Nothing, but a full Expanſion of the leaues. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mary-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 leſſe able to ſupport the *Flower*.

494 What a little *Moiſture* will doe in *Vegetables*, euen though they be dead, and ſeuered from the Earth, appeareth well in the *Experiment* of *Iuglers*. 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 only the Part that is Wreathed, and cut off the other, leaning the *Beard* halfe the Breadth of a finger in length. Then they make a little *Croſſe* of a *Quill*, long-wayes of that Part of the *Quill*, which hath the Pith; And Croſſe-wayes of that peece of the *Quill* without Pith; The whole *Croſſe* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leauing halfe of it ſticking forth of the *Quill*: Then they take a little white Box of wood, to deceiue Men, as if ſomewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Croſſe* ſinke downe, but to ſticke. Then likewiſe by way of Impoſture, they make a Queſtion; As, Who is the Faireſt Woman in the Company? Or, Who hath a Gloue, or Card? And cauſe Another to name diuers Perſons: And vpon euery Naming, they ſticke the *Croſſe* in the Box, hauing 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

they touch the *Beard* with the Tip of their Tongue, and wet it; And so sticke the *Crosse* in the Box; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the vntwining of the *Beard* by the Moisture. You may see it more euidently, if you sticke the Crosse betweene your fingers, in Stead of the Box; And therfore 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*.

It is reported by some, that the *Herb* called *Rosa-Solis*, (whetof they make Strong Waters,) will at the Noone-day, when the *Sunne* shineth hot and bright, haue a great Dew vpon 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 fauour Wonders. It were good first to be sure, that the Dew that is found vpon it, be not the Dew of the Morning Preserued, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Lease, that doth not discharge the Dew so soone, 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 Noone, than in the Morning, then sure it seemeth to be an Exudation of the *Herb* it selfe. As Plums sweat when they are set into the Ouen: for you will not (I hope) thinke, that it is like *Gedeons Fleece* of *Wool*, that the *Dew* should fall vpon that, and no where else. 495

It is certaine, that the *Honey-dews* are found more vpon *Oake-leaues*, than vpon *Ash*, or *Beech*, or the like: But whether any *Cause* be, from the *Leafe* it selfe, to concoct the Dew; Or whether it be onely, that the *Leafe* is Close and Smooth; (And therefore drinketh not in the Dew, but preserueth it;) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but vpon certaine *Herbs* or *Leaues* onely. *Flowers* that haue deepe *Sockets*, doe 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*. 496

The Experience is, that the *Froth*, which they call *Woodscare*, (being like a kinde of Spittle,) is found but vpon certaine *Herbs*, and those Hot Ones; As *Lauender*, *Lauender-cotton*, *Sage*, *Hissope*, &c. Of the *Cause* of this enquire further; For it seemeth a Secret. There falleth also *Mildew* vpon *Corne*, and smutteth it; But it may be, that the same falleth also vpon other *Herbs*, and is not obserued. 497

It were good, Triall were made, whether the great Consent betweene *Plants* and *Water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch onely. Therfore take a *Vessell*, and in the middle of it make a false Bottome of course Canuasse: Fill it with Earth aboue the Canuasse, and let not the Earth be watred; Then sow some good *Seeds* in that Earth; But vnder the Canuasse, some halfe a foot in the Bottome of the Vessell, lay a great *Spunge*, thorowly wet in water; And let it lye so some ten Dayes; And see 498

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 far stranger than this.

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

499 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 haue passed their Period, and nourish not. And all *Alteration* of Vegetables, in those Qualities, must be by somewhat, that is apt to goe into the Nourishment of the *Plant*. But this is true; that where *Kine* feed vpon *Wilde Garlicke*, their *Milke* tasteth plainly of the *Garlicke*: And the Flesh of *Muttons* is better tasted where the *Sheepe* feed vpon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liuer*, by *Milke* of a *Cow*, that feedeth but vpon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Mayden* that was fed with *Napellus*; (which is counted the Strongest Poyson of all *Vegetables*;) which with vse did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is obserued by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth vpon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleyes, where no such *Herbs* are. Thus far I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempred with diuers Powders; So of *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Egges*,) that they may be made of great vse for *Medicine*, and *Diet*, if the *Beasts*, *Fowle*, or *Fish*, be fed with a speciall kinde of food fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may be applyed vnto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Iuyce; which is hardly capable of any speciall Quality, vntill the *Plant* doe assimilate it.

500 But lest our Incredulity may preiudice any profitable Operations in this kind, (especially since Many of the Ancients haue set them down,) We thinke good briefly to propound the foure *Meanes*, which they haue deuised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it vp againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides, it is a long time in Going vp, 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 receiued from the *Medicine*, it hath the lesse way, and the lesse time, to goe vp. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, where-

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in the *Medicine* is *Infused:* Which I haue little Opinion of, becauſe the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which haue the *Propriety:* But it will be farre 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 *Watring* of the *Plant oft*, with an *Infuſion* of the *Medicine*. This, in one reſpect, may haue more force than the reſt; Becauſe the *Medication* is oft renewed; Whereas the reſt are applyed but at one time: And therefore the Vertue may the ſooner vaniſh. But ſtill I doubt, that the *Root* is ſomewhat too ſtubborne to receiue thoſe fine *Impreſſions*; And beſides, (as I ſaid before,) they haue a great *Hill* to goe vp. I iudge therefore the likelieſt way to be the *Perforation* of the *Body* of the *Tree*, in *ſeuerall Places, one aboue the other*; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*. And the *Watring* of thoſe *Lumpes* of *Dung*, with Squirts of an *Infuſion* of the *Medicine* in *Dunged water*, once in three or foure Daies,

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NATVRALL HISTORIE.

VI. Century.

OVR *Experiments* we take care to be, (as we haue often ſaid,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vſe*, or of *Diſcouery*: For we hate *Impoſtures*; And deſpiſe *Curioſities*. Yet becauſe we muſt apply our Selues ſomewhat to Others, wee will ſet downe ſome *Curioſities* touching *Plants*.

Experiments in Conſort, touching *Curioſities* about *Fruits* and *Plants*.

It is a *Curioſity*, to haue *ſeuerall Fruits* vpon *one Tree*; And the more, when ſome of them come *Earely*, and ſome come *Late*; So that you may haue, vpon the ſame *Tree*, Ripe *Fruits* all Sommer. This is eaſily done, by Grafting of ſeuerall *Cions*, vpon ſeuerall Boughes, of a Stock, in a good Ground, plentifully fed. So you may haue all Kindes of *Cherries*, and all kindes of *Plums*, and *Peaches*, and *Apricots*, vpon one *Tree*; But I conceiue the *Diuerſity* of *Fruits* muſt be ſuch, as will graft vpon the ſame Stocke. And therefore I doubt, whether you can haue *Apples*, or *Peares*, or *Orenges*, vpon the ſame Stocke, vpon which you graft *Plummes*. 501

It is a *Curioſity* to haue *Fruits* of *Diuers Shapes*, and *Figures*. This is eaſily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may haue *Cucumbers*, &c. as Long 502

as a Cane; Or as Round as a Spheare; Or formed like a Crosse. You may haue also *Apples*, in the forme of *Peares*, or *Limons*. You may haue also *Fruit* in more Accurate Figures; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds. Wherein you must vnderstand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greatest: For else you will choake the Spreading of the *Fruit*; Which otherwise would spread it selfe, and fill the Concaue, and so be turned into the *Shape* desired; As it is in Mould-workes of Liquid Things. Some doubt may be conceiued, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Couered. *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 haue *Inscriptions*, or *Engrauings*, 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.

——Tenerisq; meos incidere Amores
Arboribus, crescent illæ, crescetis Amores.

504 You may haue *Trees apparrelled* with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth holpen* with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and such like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with some Feeding from the *Trees*. 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 selfe.

505 It is an ordinary *Curiosity*, to *Forme Trees* and *Shrubs*, (as *Rosemary*, *Iuniper*, 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 keepe Figure: Great *Castles* made of *Trees* vpon 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 obserued by some, that *Gilly-flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watred, nor New Moulded, nor Transplanted, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* commeth of Scarcity of Nourishment; Except in Flowers that are onely *White*, and admit no other *Colours*.

507 It is good therefore, to see what *Natures* doe accompany what *Colours*; For by that you shall haue Light, how to induce *Colours*, by Producing those *Natures*. *Whites* are more Inodorate, (for the most part,) than

than *Flowers* of the same kinde *Coloured*; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. Wee finde also, that *Blossomes* of *Trees*, that are *White*, are commonly Inodorate; As *Cherries*, *Peares*, *Plummes*; 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 *Colours*. And if it bee too Sparing, and Thinne, 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 haue them sweet. As we see in *White Satyrian*, which is of a Dainty Smell; And in *Beane-Flowers*, &c. And againe, if the *Plant* be of Nature, to put forth *White Flowers* onely, and those not thinne, or dry, they are commonly of rancke and fulsome Smell; As *May-Flowers*, and *White Lilies*.

Contrariwise, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taste, than the *Coloured*; As wee see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The *Cause* is, for that the *Coloured* are more iuyced, and courser iuyced; And therefore not so well and equally Concocted; But the *White* are better proportioned, to the Disgestion of the *Plant*. 508

But in *Fruits*, the *White* commonly is meaner; As in *Peare-Plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberry*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harueste 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 Ouer-watry; Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste; And therefore all your dainty *Plummes*, are a little dry, and come from the Stone; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to be *Blacke*, are of the Nature of *Berries*, sweetest such as are Paler; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more sowre. 509

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Cloue-Gilly-Flower*, which is the most Common;) And sow it; And there will come vp *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 haue two or three *Roots* amongst an hundred, that are rare, and of great Price: As *Purple*, *Carnation* of seuerall *Stripes*; The *Cause* is; (no doubt,) that in *Earth*, though it be contiguous, and in one Bed, there are very seuerall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come vp *Purple*, doe alwayes come vp Single; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leafe*. This *Experiment* of seuerall *Colours*, 510

lours, comming vp from one *Seed*, would be tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

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

512 The Generall *Colour* of *Plants* is *Greene*; which is a *Colour* that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaues* of some *Trees* turne a little *Murry*, or *Reddish*; And they be commonly *Young Leaues* that doe so; As it is in *Oakes*, and *Vines*, and *Hasle*. *Leaues* rot into a *Yellow*; And some *Hollies* haue part of their *Leaues Yellow*, that are, (to all seeming,) as Fresh and Shining, as the *Greene*. I suppose also, that *Yellow* is a lesse Succulent *Colour*, than *Greene*; And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaues* of *Holly* stand euer towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Blood-Red*, Stalke and Leafe, and all; as *Amaranthus*. Some *Herbs* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some haue *White Leaues*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure*, and a *Faire Purple*, are neuer found in *Leaues*. This sheweth, that *Flowers* are made of a Refined Iuyce, of the Earth; And so are *Fruits*: But *Leaues* of a more Course, and Common.

513 It is a *Curiosity* also to make *Flowers Double*; Which is effected by *Often Remouing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not Remouing, proue *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips* of *Flowers*; And as soone as they come vp, to remoue them into New Ground, that is good. Enquire also, whether *Inoculating* of *Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Muske-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*; 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 breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that haue *Blossomes Blush-Coloured*.

514 The *Making* of *Fruits*, without *Core* or *Stone*, is likewise a *Curiosity*; And somewhat better: Because whatsoeuer maketh them so, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be set in the Ground, haue the *Pith* finely taken forth, (and not altogether, but some of it left, the better to saue the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to be, of diuiding a *Quicke-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it vp againe.

It

It is reported also, that a *Citron* grafted vpon a *Quince*, will haue small or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted vpon a *Stocke*, that beareth a *Sweeter Fruit*, may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernells*, or *Seeds*. 515

It is reported, that not only the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* 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 boare a *Tree* cleane thorow, and put a wedge in. It is true, there is some Affinitie betweene the *Pith*, and the *Kernell*, because they are both of a harsh Substance, and both placed in the Middest. 516

It is reported, that *Trees watred* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core*, or *Stone*. And the Rule is generall, that what soeuer will make a *Wilde-Tree* a *Garden-Tree*, will make a *Garden-Tree* to haue lesse *Core*, or *Stone*. 517

The Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baser in the same Kinde; And sometimes so farre, as to change into another Kinde. 1. The *Standing long*, and not being *Remoued*, maketh them *degenerate*. 2. *Drought*, vnlesse the Earth of it selfe be moist, doth the like. 3. So doth *Remouing into worse Earth*, or *Forbearing to Compost the Earth*; As wee see that *Water-Mint* turneth into *Field-Mint*; And the *Colewort* into *Rape* by Neglect, &c. Experiments in Consort touching the *Degenerating* of *Plants*; And of the *Transmutation* of them, one into another.

Whatsoeuer *Fruit* vseth to bee set vpon a *Root*, or a *Slip*, if it bee *sowne*, will *degenerate*. *Grapes sowne*; *Figs*, *Almonds*, *Pomgranate Kernells sowne*; make the *Fruits degenerate*, and become Wilde. And againe, Most of those *Fruits* that vse to be *grafted*, if they be set of *Kernells*, or *Stones*, *degenerate*. It is true, that *Peaches*, (as hath beene touched before,) doe better vpon *Stones Set*, than vpon *Grafting*: And the Rule of Exception should seeme to be this; That whatsoeuer *Plant* requireth much Moisture, prospereth better vpon the *Stone*, or *Kernell*, than vpon the *Graft*. For the Stocke, though it giueth a finer Nourishment, yet it giueth a scanter, than the Earth at large. 518 519

Seeds, if they be very *Old*, and yet haue strength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilfull Gardiners make triall of the *Seeds*, before they buy them, whether they be good or no, by Putting them into Water gently Boyled; And if they be good, they will sprout within Halfe an Houre. 520

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turne into *Wilde Thyme*: Although those two *Herbs* seeme to haue small Affinitie; but *Basill* is almost the only Hot *Herbe*, that hath Fat and Succulent *Leaues*; Which Oylinesse, if it be drawne 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 *Wilde 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 selfe. 522

It

523 It is not impossible, and I haue heard it verified, that vpon *Cutting downe* 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 Iuyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a smaller kinde, that needeth lesse Nourishment.

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

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

Grandia sæpè quibus mandauimus Hordea Sulcis,
Infœlix Lolium, & steriles dominantur Auenæ.

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

This worke of the *Transmutation* of *Plants*, one into another, is *inter Magnalia Naturæ*: For the *Transmutation* of *Species* is, in the vulgar philosophie, pronounced Impossible: And certainly, it is a thing of difficultie, and requireth deepe Search into Nature: But seeing there appeare some manifest *Instances* of it, the Opinion of Impossibilitie is to be reiected; And the Meanes thereof to be found out. Wee see, that in *Liuing Creatures*, that come of *Putrefaction*, there is much *Transmutation*, of one into another; As *Catterpillers* turne into *Flies*, &c. And it should seeme probable, that whatsoeuer *Creature*, hauing life, is generated without *Seed*, that *Creature* will change out of one *Species* 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 wee may well conclude, that seeing the Earth, of it selfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well haue a *Transmigration* of *Species*. Wherefore Wanting *Instances*, which doe occurre, wee shall giue Directions of the most likely *Trialls*: And generally, wee would not haue those, that read this our Worke of *Sylua Syluarum*, account it strange, or thinke that it is an Ouer-Haste, that wee haue set downe Particulars vntried; For contrariwise, in our owne Estimation, we account such Particulars, more worthy, than those that are al-

ready

ready tried and knowne. For these Later must be taken as you finde them; But the Other doe leuell Point blanke at the *Inuenting* of *Causes*, and *Axiomes*.

First therefore you must make account, that if you will haue one *Plant* change into another, you must haue the *Nourishment* ouer-rule the *Seed*; And therefore you are to practise it by *Nourishments* as contrary, as may be, to the *Nature* of the *Herbe*; So neuertheleſſe as the *Herbe* may grow; And likewise with *Seeds* that are of the Weakest Sort, and haue least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them vpon Tops of Hills, and Champaignes; And such *Plants* as require much Moisture, vpon Sandy and very drie Grounds. As for Example, *Marsh-Mallowes*, and *Sedge*, vpon Hills; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, vpon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, and *Brakes*, vpon a *Wet* or *Marsh Ground*. This I conceiue also, that all *Esculent* and *Garden-Herbs*, set vpon the Tops of Hills, will proue more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wilde-Herbs* you may make *Sallet-Herbs*. This is the first Rule for *Transmutation* of *Plants*. 526

The second Rule shall be to burie some few *Seeds*, of the *Herbe* you would change, amongst other *Seeds*; And then you shall see, whether the Iuyce of those other *Seeds*, doe not so qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsly-Seed*; Or *Basill-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forraine *Seed*. 527

The third Rule shall be, the *Making* of some *Medley* or *Mixture* of *Earth*, with some other *Plants Bruised*, or *Shauen*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort-Leaues*, stamped, and set in it *Artichoakes*, or *Parsnips*; So take *Earth* made with *Matoram*, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the Processe of Nature still will be, (as I conceiue,) not that the *Herbe* you worke vpon, should draw the Iuyce of the Forraine *Herbe*; (For that Opinion wee haue formerly reiected;) But that there will be a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*. 528

The fourth Rule shall be, to marke what *Herbs*, *some Earths doe put forth of themselues*; And to take that *Earth*, and to *Pot* it, or to *Vessell* it; And in that to set the *Seed* you would change: As for example, take from vnder 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 Euent will be: Or take *Earth*, that you haue prepared to put forth *Mushromes*, 529

romes, of it selfe, (whereof you shall finde some *Instances* following;) And sow in it *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*.

530 The fifth Rule shall be, to make the *Herbe grow Contrary to his Nature*; As to make *Ground-Herbes* rise in *Heighth*: As for example; Carry *Camowill*, or *Wilde-Thyme*, or the *Greene Strawberry*, vpon Sticks, as you doe *Hops* vpon Poles; And see what the Euent will be.

531 The sixth Rule shall be, to make *Plants grow out of the Sunne, or Open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell vp *Earth*, and sow some *Seed* in it, and put it in the Bottome of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of Caues; And Pots with *Seeds* sowne, hanged vp in Wells, some distance from the Water, and see what the Euent will be.

Experiments in Consort touching the *Procerritie*, and *Lownesse*, and *Artificiall dwarfing* of *Trees*.

It is certaine, that *Timber-Trees* in *Coppice-Woods*, grow more vpright, and more free from Vnder-Boughs, than those that stand in the *Field*: The *Cause* whereof is, for that *Plants* haue 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 euer hindreth Stature; Lastly, they are kept warme; And that euer in *Plants* helpeth Mounting.

532

533 *Trees*, that are, of themselues, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gumms*,) as *Firrs*, and *Pines*, mount of themselues in Heighth without Side-Boughs, till they come towards the Top. The *Cause* is, partly Heat; And partly Tenuitie of Iuyce; Both which send the Sap vpwards. As for *Iuniper*, it is but a *Shrub*, and groweth not bigge enough in Body, to maintaine a tall *Tree*.

534 It is reported, that a Good Strong *Canuas*, spread ouer a *Tree* grafted low, soone after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all Things that grow, will grow as they finde Roome.

535 *Trees* are generally set of *Roots*, or *Kernells*; 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 *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

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

Experiments in Consort, touching the

The *Scripture* saith, that *Salomon* wrote a *Naturall History*, from the *Cedar* of *Libanus*, to the *Mosse growing vpon the Wall*: For

For so the best *Translations* haue it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Rudiments of Plant. & the Expression of Plants & Imperfect plants.

Mosse groweth chiefly vpon *Ridges* of *Houses*, tiled or thatched; And vpon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant Greene. The Growing vpon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of Moisture and Water, so on the other side the *Water* must but Slide, and not Stand or Poole. And the *Growing* vpon *Tiles*, or *Walls*, &c. is caused, for that those dried Earths, hauing not Moisture sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by Age, or otherwise, they grow to relent and resolue, they sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little Stalkes, besides the low Thrumme. 537

Mosse groweth vpon *Alleyes*, especially such as lye Cold, and vpon the North; As in diuers Tarrasses: And againe, if they be much trodden; Or if they were, at the first, grauelled; For wheresoeuer *Plants* are kept downe, the Earth putteth forth *Mosse*. 538

Old Ground, that hath beene long vnbroken vp, gathereth *Mosse*: And therfore Husbandmen vse to cure their *Pasture Grounds*, when they grow to *Mosse*, by Tilling them for a yeare, or two: Which also dependeth vpon the same *Cause*; For that, the more Sparing and Staruing Iuyce of the Earth, insufficient for *Plants*, doth breed *Mosse*. 539

Old Trees are more *Mossy*, (farre) than *Young*; For that the Sap is not so francke as to rise all to the Boughes, but tireth by the way, and putteth out *Mosse*. 540

Fountaines haue *Mosse* growing vpon the *Ground* about them; 541

Muscosi Fontes; ————————

The *Cause* is, for that the *Fountaines* draine the *Water* from the *Ground Adiacent*, and leaue but sufficient Moisture to breed *Mosse*: And besides, the *Coldnesse* of the *Water* conduceth to the same.

The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is Excerned, and doth not Assimilate. And vpon great *Trees* the *Mosse* gathereth a Figure, like a *Leafe*. 542

The *Moister Sort* of *Trees* yeeld little *Mosse*; As we see in *Aspes*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly caused, for the Reason that hath beene giuen, of the francke Putting vp of the *Sap* into the *Boughes*; And partly, for that the *Barkes* of those *Trees*, are more Close and Smooth, than those of *Oakes*, and *Ashes*; Whereby the *Mosse* can the hardlier issue out. 543

In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both vpon *Body* and *Boughes*; Which is caused, partly by the *Coldnesse* of the *Ground*, whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get vp, to spread so franckly, as it should doe. 544

545 Wee haue said heretofore, that if *Trees* be *Hide-bound*, they wax leſſe Fruitfull, and gather *Moſſe*: 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 *Moſſe*: Which (I thinke) happeneth to *Trees* that ſtand Bleake, and vpon the Cold Winds. It would alſo be tried, whether, if you couer a *Tree*, ſomewhat thicke vpon the top, after his Powling, it will not gather more *Moſſe*. I thinke alſo, the *Watring* of *Trees* with *Cold Fountaine-Water*, will make them grow full of *Moſſe*.

546 There is a *Moſſe* the *Perfumers* haue, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quære* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* ſake, being a Thing of Price, I haue ſet downe the laſt *Experiments*, how to multiply, and call on *Moſſes*.

Next vnto *Moſſe*, I will ſpeake of *Muſhromes*; Which are likewiſe an *Vnperfect Plant*. Theſe *Muſhromes* haue two ſtrange *Properties*; The One, that they yeeld ſo *Delicious* a *Meat*; The other, that they *come vp* ſo *haſtily*; As in a *Night*; And yet they are *Vnſowne*. And therefore, ſuch as are Vpſtarts in State, they call, in reproch, *Muſhromes*. It muſt needs bee therefore, that they be made of much *Moiſture*; And that *Moiſture* Fat, Groſſe, and yet ſomewhat Concocted. And (indeed) we finde, that *Muſhromes* cauſe the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore, the *Surfet* of them may Suffocate, and Empoyſon. And this ſheweth, that they are Windy; And that Windineſſe is Groſſe, and Swelling; Not Sharpe, or Griping. And vpon the ſame reaſon *Muſhromes* are a venereous Meat.

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

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

549 It is reported, that *Harts-Horne*, *Shauen*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth vp *Muſhromes*. And we know *Harts-Horne* is of a Fat and Clammy Subſtance: And it may be *Oxe-Horne* would doe the like.

550 It hath beene reported, though it be ſcarce credible, that *Iuy* hath growne out of a *Stags-Horne*; Which they ſuppoſe, did rather come from

from a *Confication* of the *Horne* vpon the *Iay*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may be Trial made of some *Seeds*, as that of *Fennel-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.

There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones Hat; Which they call a *Toads-Stoole*: 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 Iuyce from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moisture*. 551

There is a *Cake*, that groweth vpon the Side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a Chesnut Colour, and hard, and pithy; Whereby it should seeme, that euen *Dead Trees* forget not their Putting forth; No more than the *Carcasses* of *Mens Bodies*, that put forth *Haire*, and *Nailes*, 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* vpon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to bee good for *Kibes*. Belike it hath a *Corrosiue*, and *Fretting Nature*. 553

There is an *Herb* called *Iewes-Eare*, that groweth vpon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange Property; For in *Warme water*, it swelleth, and openeth extremely. It is not greene, but of a dusky browne Colour. And it is vsed for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to haue a Mollifying, and Lenifying Vertue. 554

There is a Kinde of *Spongy Excrescence*, which groweth chiefly vpon the *Roots* of the *Laser-Tree*; And sometimes vpon *Cedar*, and other *Trees*. It is very White, and Light, and Friable: Which we call *Agarick*. It is famous in *Physicke* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liuer*: But Offensiue to the *Stomack*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*. 555

We finde no *Super-Plant*, that is a Formed *Plant*, but *Misseltoe*. They haue an idle Tradition, that there is a *Bird*, called a *Missel-Bird*, that feedeth vpon a *Seed*, which many times shee cannot disgest, and so expelleth it whole with her Excrement: which falling vpon a *Bough* of a *Tree*, that hath some Rift, putteth forth the *Misseltoe*. But this is a Fable: For it is not probable, that *Birds* should feed vpon that they cannot disgest. But allow that, yet it cannot be for other Reasons: For First, it is found but vpon certaine *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed vpon them. It may be, that *Bird* feedeth vpon the *Misseltoe-Berries*, and so is often found there; Which may haue giuen occasion to the Tale. But that which maketh an End of the Question, 556

ſtion, is, that *Miſſeltoe* hath beene found to put forth vnder the *Boughes*, and not (onely) aboue the *Boughes*: So it cannot be any Thing that falleth vpon the *Bough*. *Miſſeltoe* groweth chiefly vpon *Crab-Trees*, *Apple-Trees*, ſometimes vpon *Haſſles*; And rarely vpon *Oakes*; The *Miſſeltoe* whereof is counted very *Medicinall*. It is euer greene, Winter and Summer; And beareth a *White Gliſtering Berry*: And it is a *Plant*, vtterly differing from the *Plant*, vpon which it groweth. Two things therfore may be certainly ſet downe: 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 goe into a *Bough*; And beſides, it ſeemeth to be more Fat and Vnctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammy; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Miſſeltoe* may giue Light to other Practiſes. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Watring* of the Wound euery Day, with *Warme Water Dunged*, to ſee if it would bring forth *Miſſeltoe*, or any ſuch like Thing. But it were yet more likely to try it, with ſome other *Watring*, or *Anointing*, that were not ſo Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be ſuch Things as kill not the *Bough*.

558 It were good to try, what *Plants* would put forth, if they be forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and couer it, ſome thickneſſe, 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 downe 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. Try it with *Leather*, or *Cloth*, or *Painting*, ſo it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A Man may count the *Prickles* of *Trees* to be a kinde of *Excreſcence*; For they will neuer be *Boughes*, nor beare *Leaues*. The *Plants* that haue *Prickles*, are *Thornes*, blacke and white; *Brier*; *Roſe*; *Limon-Trees*; *Crab-Trees*; *Gooſe-Berry*; *Berbery*; Theſe haue it in the *Bough*, The *Plants* that haue *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *Whin-buſh*; *Thiſtle*; *Nettles* alſo haue a ſmall Venemous *Prickle*; So hath *Borrage*, but harmeleſſe. The *Cauſe* muſt be *Haſty Putting forth*; *Want* of *Moiſture*; And the *Cloſeneſſe* of the *Barke*; For the *Haſte* of the *Spirit to put forth*, and the *Want* of *Nouriſhment* to put forth a *Bough*, and the *Cloſeneſſe* of the *Barke*, cauſe *Prickles* in *Boughes*; And therefore they are euer like a *Pyramis*, for that the *Moiſture* ſpendeth after a little Putting forth. And for *Prickles* in *Leaues*, they come alſo of *Putting forth more Iuyce* into the *Leafe*, than can ſpread in the *Leafe* ſmooth; And therefore the *Leaues* otherwiſe are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaues* of *Holly*, they are *Smooth*, but neuer *Plaine*, but as it were with *Folds*, for the ſame *Cauſe*.

There

There be also *Plants*, that though they haue no *Prickles*, yet they haue a Kinde of *Downy* or *Velue: Rine*, vpon their *Leaues*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, haue beene applied, (with successe,) to the *Wrests* of those that haue had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a Sanatiue vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*. 560

Another Kinde of *Excrescence* is an *Exudation* of *Plants*, ioyned with *Putrefaction*; As we see in *Oake-Apples*, which are found chiefly vpon the *Leaues* of *Oakes*; And the like vpon *Willowes*: And Countrey People haue a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a Signe of a *Pestilent Yeare*; Which is a likely Thing, because they grow of Corruption. 561

There is also vpon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of diuers Colours; Which if you cut, you shall euer finde full of little white *Wormes*. 562

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

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 Kindes of *Herbs*: But some *Time* is required, for the *Germination*; For if it be taken, but from a *Fathome* deepe, it will put forth the *First Yeare*; If much deeper, not till after a *Yeare*, or *Two*. 563

The *Nature* of the *Plants* growing out of *Earth* so taken vp, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and Fine, it putteth forth Soft *Herbs*; As *Grasse*, *Plantine*, and the like; If the *Earth* be Harder and Coarser, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c. 564

It is Common *Experience*, that where *Alleyes* are close *Grauelled*, the *Earth* putteth forth, the first yeare, *Knot-grasse*, and after *Spire-grasse*. The *Cause* is, for that the *Hard Grauell*, or *Pebble* at the first Laying, will not suffer the *Grasse* to come forth vpright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the Top, the Ordinary *Grasse* commeth vp. 565

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 Iuycy Substance; As *Penny-wort*, *Purslane*, *Houseleeke*, *Penny-royall*, &c. 566

The *Water* also doth send forth *Plants*, that haue no *Roots* fixed in the Bottome; But they are lesse *Perfect Plants*, being almost but *Leaues*, and those Small ones: Such is that we call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher Greene, and putteth forth a little *String* into the *Water*, farre from the *Bottome*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so haue a Number of other *Herbs* that grow in *Ponds*. 567

It is reported by some of the *Ancients*, and some *Moderne Testimony* likewise, that there be some *Plants*, that grow vpon the Top of the *Sea*; 568

Being

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 haue *Roots*; but the *Sea-weed* vnder the *Water*, the *Sea-Thiſtle* but vpon the *Shore*.

569 The Ancients haue noted, that there are ſome *Herbs*, that grow out of *Snow*, laid vp cloſe together, and *Putrified*; And that they are all *Bitter*; And they name one ſpecially, *Flomus*, which wee call *Moth-Mullein*. It is certaine, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not vnlike, that it may likewiſe put forth *Plants*.

570 The *Ancients* haue affirmed, that there are ſome *Herbs*, that grow out of *Stone*; Which may be, for that it is certain, that *Toads* haue been found in the Middle of a Free-Stone. We ſee alſo, that *Flints*, lying aboue *Ground*, gather *Moſſe*; And *Wall-Flowers*, and ſome other *Flowers*, grow vpon *Walls*; But whether vpon the Maine *Bricke*, or *Stone*, or whether out of the *Lime*, or *Chinckes*, is not well obſerued; For *Elders* and *Aſhes* haue beene ſeene to grow out of *Steeples*: But they manifeſtly grow out of *Cleftes*; In ſo much as when they grow big, they will diſioyne 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 beene found, that great *Trees* growing vpon *Quarries*, haue put downe their *Root* into the *Stone*.

571 In ſome *Mines* in *Germany*, as is reported, there grow in the Bottome *Vegetables*; And the *Worke-Folkes* vſe to ſay, they haue *Magicall Vertue*; And will not ſuffer Men to gather them.

572 The *Sea-Sands* ſeldome beare *Plants*. Whereof the *Cauſe* is yeelded, by ſome of the *Ancients*, for that the *Sunne* exhaleth the *Moiſture*, before it can incorporate with the *Earth*, and yeeld a Nourſhment 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 owne *Store*, without any *Nouriſtment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment* 29.

Experiments in Conſort touching *Forraine Plants*.

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

574

575 *Plants* brought out of *Hot Countries*, will endeuour to put forth, at the ſame *Time*, that they vſually do in their owne *Climate*; And therfore to preſerue them, there is no more required, than to keepe them from the Iniury of Putting backe by *Cold*. It is reported alſo, that *Graine* out of

of the *Hotter Countries* transſlated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Countrey*. It is likely, that this will proue better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; 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 Remoued.

Many *Plants*, which grow in the *Hotter Countries*; being ſet in the *Colder*, will neuertheleſſe, euen in thoſe *Cold Countries*, being ſowne of *Seeds* late in the *Spring*, come vp and abide moſt Part of the *Summer*; As we finde it in *Orenge*, and *Limon-Seeds*, &c. The *Seeds* whereof, Sowen in the End of *Aprill*, will bring forth Excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Cloue-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be ſowen, would doe the like. 576

Experiments in Conſort, touching the *Seaſons* in which *Plants* come forth.

There be ſome *Flowers*, *Bloſſomes*, *Graines*, and *Fruits*, which come more *Early*; And Others which come more *Late* in the Yeare. The *Flowers* that come early, with vs, are; *Prime-Roſes*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and ſome early *Tulippa's*. And they are all *Cold Plants*; Which therefore, (as it ſhould ſeeme,) haue a quicker *Perception*, of the *Heat* of the *Sunne* Increaſing, than the *Hot Herbs* haue; As a *Cold Hand* will ſooner finde a little *Warmth*, than a *Hot*. And thoſe that come next after, are *Wall-Flowers*, *Cowſlips*, *Hyacinths*, *Roſemary-Flowers*, &c. And after them, *Pincks*, *Roſes*, *Flowerdeluces*, &c. And the lateſt are *Gilly-Flowers*, *Holly-oakes*, *Larkes-Foot*, &c. The Earlieſt *Bloſſomes* are, the *Bloſſomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of ſuch *Trees*, as haue much *Moiſture*, either *Watrie*, or *Oylie*. 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 *Graines* are, firſt *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Peaſe* and *Beanes*. For though Greene *Peaſe* and *Beanes* be eaten ſooner, yet the Drie Ones, that are vſed for *Horſe-Meat*, are ripe laſt; And it ſeemeth that the Fatter *Graine* commeth firſt. The Earlieſt *Fruits* are, *Strawberries*, *Cherries*, *Gooſeberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Raſps*; And after them *Damaſins*, and moſt Kinde of *Plums*, *Peaches*, &c. And the lateſt are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Heps*, *Medlars*, *Seruices*, *Cornelians*, &c. 577

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 Prouidence, that they bloſſome ſo ſoone; For otherwiſe, they could not haue the *Sunne* long enough to ripen. 578

There be Fruits, (but rarely,) that come *twice* a *Yeare*; as ſome *Peares*, *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*, commeth twice a Yeare; Eſpecially the *Double White*; And that alſo is 579

is a *Plant* full of Moisture. *Roses* come twice, but it is not without *Cutting*, as hath beene formerly said.

580 In *Muscouia*, though the *Corne* come not vp, till late *Spring*, yet their *Harueſt* is as Early as Ours. The *Cauſe* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee ſee with vs, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after thoſe kinde of *Winters* likewiſe, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the ſame time; Which troubleth the *Husbandman* many times; For you ſhall haue *Red Roſes*, and *Damaske Roſes*, come together; And likewiſe the *Harueſt* of *Wheat* and *Barley*. But this happeneth euer, for that the Earlier ſtaieth for the Later; And not that the Later commeth ſooner.

581 There be diuers *Fruit-Trees*, in the *Hot Countries*, which haue *Bloſſomes*, and *Young Fruit*, and *Ripe Fruit*, almoſt all the Yeare, ſucceeding one another. And it is ſaid, the *Orenge* hath the like with vs, for a great Part of Summer; And ſo alſo hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to haue ſo; But that either they want *Iuyce* 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 *Borrage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Baſill*, *Tobacco*, *Muſtard-Seed*, and all kindes of *Corne*; Some continue many Yeares; As *Hyſſope*, *Germander*, *Lauander*, *Fennell*, &c. The *Cauſe* of the *Dying* is double; The firſt is the *Tenderneſſe* and *Weakneſſe* of the *Seed*, which maketh the Period in a ſmall time; As it is in *Borrage*, *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 haue (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 *Oakes*, *Elme*, *Cheſ-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largeſt Size*, are of ſmall Durance; Whereas *Hyſſope*, *Winter-Sauoury*, *Germander*, *Thyme*, *Sage*, will laſt long.. The *Cauſe* is, for that *Trees* laſt according to the *Strength*, and *Quantitie* of their *Sap* and *Iuyce*; Being well munited by their *Barke* againſt the Iniuries of the *Aire*: But *Herbs* draw a Weake *Iuyce*; And haue a Soft *Stalke*; And therefore thoſe amongſt them which laſt longeſt, are *Herbs* of *Strong Smell*, and with a *Sticky Stalke*.

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

585 *Trees*, that bring forth their *Leaues* late in the *Yeare*, and caſt them likewiſe late, are more *laſting*, than thoſe that ſprout their Leaues Early, or

ſhed

ſhed them betimes. The *Cauſe* is, for that the late *Comming forth* ſheweth a *Moiſture* more fixed; And the other more looſe, and more eaſily reſolued. And the ſame *Cauſe* is, that *Wilde-Trees* laſt longer than *Garden-Trees*; And in the ſame kinde, thoſe whoſe *Fruit* is Acide, more than thoſe whoſe *Fruit* is ſweet.

Nothing procureth the *Laſting* of *Trees, Buſhes, and Herbs*, ſo much, as often *Cutting*: For every *Cutting* cauſeth a Renouation of the *Iuyce* of the *Plant*; That it neither goeth ſo farre, nor riſeth ſo faintly, as when the *Plant* is not *Cut*: Inſomuch as *Annuall Plants*, if you cut them ſeaſonably, and will ſpare the vſe of them, and ſuffer them to come vp ſtill young, will laſt more Yeares than one; As hath beene partly touched; Such as is *Lettuce, Purſlane, Cucumber*, and the like. And for *Great Trees*, we ſee almoſt all *Ouer-growne Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height. 586

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 euer preſuppoſe, that you handle it ſo, as the *Winter* killeth it not; For we ſpeake onely of *Prolonging* the *Naturall Period*. I conceiue, that the *Rule* will hold; That whatſoeuer maketh the *Herbe* come later, than at his time, will make it laſt longer time: It were good to try it, in a *Stalke* of *Wheat*, &c. ſet in the Shade, and encompaſſed with a Caſe of *Wood*, not touching the *Straw*, to keepe out Open *Aire*. 587

As for the Preſeruation *of* Fruits, *and* Plants, *as well vpon the* Tree, *or* Stalke, *as gathered, we ſhall handle it vnder the* Title *of* Conſeruation *of* Bodies.

Experiments in Conſort touching the ſeuerall *Figures* of *Plants*.

The *Particular Figures* of *Plants* we leaue to their *Deſcriptions*; But ſome few Things, in generall, we will obſerue. *Trees* and *Herbs*, in the Growing forth of their *Boughes*, and *Branches*, are not *Figured*, and keep no Order. The *Cauſe* is, for that the *Sap*, being reſtrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth caſually, where they finde beſt way, in the *Barke*, or *Rinde*. It is true, that ſome *Trees* are more ſcattered in their *Boughes*; 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 *Peare Tree*, (which the *Critickes* will haue to borrow his name of πῦρ, *Fire*,) *Orenge-Trees Firre-Trees, Seruice-Trees, Lime-Trees*, &c. And ſome are more ſored and broad; As *Beeches, Hornebeame*, &c. The reſt are more indifferent. The *Cauſe* of Scattering the *Boughes*, is the Haſty breaking forth of the *Sap*; And therefore thoſe *Trees* riſe not in a *Body* of any Height, but branch neare 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 equall degrees. The 588

Spreading is cauſed by the *Carrying* vp of the *Sap*, plentifully, without Expence; And then putting it forth ſpeedily, and at once.

589 There be diuers *Herbs*, but no *Trees*, that may be ſaid to haue ſome kinde of Order, in the Putting forth of their *Leaues*: For they haue *Ioynts*, or *Knuckles*, as it were Stops in their *Germination*; As haue *Gilly-Flowers*, *Pinckes*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cauſe* whereof is, for that the *Sap* aſcendeth vnequally, and doth (as it were) tire and ſtop by the way. And it ſeemeth, they haue ſome *Cloſeneſſe*, and *Hardneſſe* in their *Stalke*, which hindreth the *Sap* from going vp, vntill it hath gathered into a Knot, and ſo is more vrged to put forth. And therefore, they are moſt of them hollow, when the *Stalke* is dry. As *Fennell-Stalke*, *Stubble*, and *Canes*.

590 *Flowers* haue (all) exquiſite *Figures*; And the *Flower-Numbers* are (chiefly) *Fiue*, and *Foure*; As in *Prime-Roſes*, *Brier-Roſes*, *Single Muſke-Roſes*, *Single Pinkes*, and *Gilly-Flowers*, &c. which haue fiue *Leaues*: *Lillies*, *Flower-de-luces*, *Borage*, *Bugloſſe*, &c. which haue foure Leaues. But ſome put forth *Leaues* not Numbred; But they are euer ſmall Ones; As *Mary-Golds*, *Trifoile*, &c. We ſee alſo, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the Fiue *Brethren* of the *Roſe*; *Sockets* of *Gilly-Flowers*, &c. *Leaues* alſo are all *Figured*; Some Round, Some Long; None Square; And many iagged on the Sides; Which *Leaues* of *Flowers* ſeldome are. For I account the *Iagging* of *Pinkes*, and *Gilly-Flowers*, to be like the Inequality of *Oake-leaues*, or *Vine-leaues*, or the like; But they ſeldome or neuer haue any ſmall *Purles*.

Experiments in Conſort, touching ſome *Principall Differences* in *Plants*.

Of *Plants*, ſome few put forth their *Bloſſomes* before their *Leaues*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But moſt put forth ſome *Leaues* before their *Bloſſomes*; As *Apples*, *Peares*, *Plums*, *Cherries*, *White-Thorne*, &c. The *Cauſe* is, for that thoſe, that put forth their *Bloſſomes* firſt, haue either an Acute and *Sharpe Spirit*; (And therfore commonly they all put forth earely in the Spring, and ripen very late; As moſt of the Particulars before mentioned;) Or elſe an *Oyly Iuyce*, which is apter to put out *Flowers*, than *Leaues*.

591

592 Of *Plants*, ſome are *Greene* all *Winter*; Others caſt their *Leaues*. There are *Greene* all *Winter*; *Holly*, *Iuy*, *Box*, *Firre*, *Eugh*, *Cypreſſe*, *Iuniper*, *Bayes*, *Roſe-Mary*, &c. The *Cauſe* of the Holding *Greene*, is the Cloſe and Compact *Subſtance* of their *Leaues*, and the *Pedicles* of them. And the *Cauſe* of that againe, is either the *Tough* and *Viſcous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the firſt Sort is *Holly*; Which is of ſo *Viſcous* a *Iuyce*, as they make *Bird-lime* of the *Barke* of it. The *Stalke* of *Iuy* is Tough, and not Fragile, as we ſee in other ſmall Twigs dry. *Firre* yeeldeth *Pitch*. *Box* is a faſt and heauy *Wood*, as we ſee it in *Bowles*. *Eugh* is a Strong and Tough *Wood*, as we ſee it in *Bowes*. Of the ſecond Sort is *Iuniper*, which is a *Wood* Odorate, and maketh a hot Fire. *Bayes* is likewiſe a Hot and Aromaticall *Wood*; And ſo is *Roſe-Mary* for a *Shrub*. As for the *Leaues*, their Denſity appeareth, in that, either they are Smooth and

and Shining, as in *Bayes*, *Holly*, *Iuy*, *Box*, &c. Or in that they are Hard and Sp'ry, as in the rest. And Triall would be made of *Grafting* of *Rose-Mary*, and *Bayes*, and *Box*, vpon a *Holly-Stocke*; Because they are *Plants* that come all *Winter*. It were good to try it also with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde-Trees*; To see whether they will not yeeld their *Fruit*, or beare their *Leaues*, 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 vpon a *Holly*, will proue both an Earlier, and a Greater *Tree*.

There be some *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be some, that beare *Flowers*, and no *Fruit*: There be some that beare neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewise) of the *Fruit-Trees*; As *Mulberry*, *Wall-nut*, &c. And some *Shrubs*, (as *Iuniper*, *Holly*, &c.) beare no *Flowers*. Diuers *Herbs* also beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Purslane*, &c. Those that beare *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 Blossomes*, may not be doubled. There are some Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c. 593

There be some *Plants*, that shoot still vpwards, and can *Support* themselues; As the greatest Part of *Trees* and *Plants*: There be some Other, that *Creepe* along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot support themselues; As *Vines*, *Iuy*, *Briar*, *Briony*, *Woodbines*, *Hops*, *Climatis*, *Camomill*, &c. The *Cause* is, (as hath beene partly touched,) for that all *Plants*, (naturally) moue vpwards; But if the *Sap* put vp too fast, it maketh a slender *Stalke*, which will not support the weight: And therefore these latter Sort are all Swift and Hasty Commers. 594

The first and most Ordinary *Helpe* 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, vnlesse it be mingled. That of *Pigeons* for a Garden, or 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 *Graxing Ground*, to spread it somewhat late, towards *Winter*; That the *Sunne* may haue the lesse Power to dry it vp. As for speciall *Composts* for *Gardens*, (as a *Hot Bed*, &c.) we haue handled them before. Experiments in Consort touching all Manner of *Composts*, and *Helps* of Ground. 595

The Second *Kind* of *Compost*, is, the *Spreading* of diuers *Kinds* of *Earths*; As *Marle*, *Chalke*, *Sea-Sand*, *Earth* vpon *Earth*, *Pond Earth*; And the *Mixtures* of them. *Marle* is thought to be the best; As hauing most Fatnesse; 596

And not 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 Rudiment of life. *Chalke* ouer-heateth the *Ground* a little. And therfore is beſt vpon *Cold Clay-Grounds*, or *Moiſt Grounds*: But I heard a great *Husband* ſay, that it was a common Errour, to thinke that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Wheras (indeed) it helpeth *Graſſe*, as well as *Corne*: But that which breedeth the Errour is, becauſe after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Reſt; And then (indeed) afterwards it will beare little *Graſſe*, becauſe the *Gound* is tired out. It were good to try the laying of *Chalke* vpon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it muſt be Friable firſt, by Raine, or Lying: As for *Earth*, it *Cõpaſſeth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred vpon it; And it did beare *Fruit* excellently the firſt yeare of the Planting: For the *Surface* of the *Earth* is euer the Fruitfulleſt. And *Earth* ſo prepared hath a double *Surface*. But it is true, as I cõceiue, 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 Houell, thatched, ouer ſome Quantity of Ground; Nay if you doe but Plancke the Ground ouer, it will breed *Salt-petre*. As for *Pond-Earth*, or *Riuer-Earth*, it is a very good *Compoſt*; Eſpecially if the *Pond* haue beene long vncleanſed, and ſo the *Water* be not too Hungry: And I iudge it will be yet better, if there be ſome *Mixture* of *Chalke*.

597 The Third *Helpe* of *Ground*, is, by ſome other *Subſtances*, that haue a Vertue to make *Ground* Fertile; though they be not meerely *Earth*: wherein *Aſhes* excell; In ſo much as the Countries about *Ætna*, and *Veſuuius*, haue a kinde of Amends made them, for the Miſchiefe the Eruptions (many times) doe, by the exceeding *Fruitfulneſſe* of the *Soyle*, cauſed by the *Aſhes*, ſcattered about. *Soot* alſo, though thinne ſpred, in a *Field*, or *Garden*, is tried to be a very good *Compoſt*. For *Salt*, it is too Coſtly: But it is tryed, that mingled with *Seed-Corne*, and ſowen together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all ouer. As for the *Steeping* of the *Seeds*, in ſeuerall *Mixtures* with *Water*, to giue them Vigour; Or *Watring Grounds* with *Compoſt-Water*; We haue ſpoken of them before.

598 The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables to dye into the Ground*; And ſo to Fatten it; As the *Stubble* of *Corne*, Eſpecially *Peaſe*. *Brakes* caſt vpon the *Ground*, in the Beginning of *Winter*, will make it very Fruitfull. It were good (alſo) to try, whether *Leaues* of *Trees* ſwept together, with ſome *Chalke* and *Dung* mixed, to giue them more Heart, would not make a good *Compoſt*: For there is nothing loſt, ſo much as *Leaues* of *Trees*; And as they lye ſcattered, and without Mixture, they rather make the *Ground* ſoure, than otherwiſe.

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The Fifth *Helpe* of *Ground*, is *Heat* and *Warmth*. It hath beene anciently practised to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, vpon the *Ground*: Wee see, that *Warmth* of *Walls* and *Enclosures*, mendeth *Ground*: We see also that *Lying open* to the *South*, mendeth *Ground*: We see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *Compost*: And it may be doubted, whether the *Couering* 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* doe suspect, that the *Gathering* vp of *Flints*, in *Flinty Ground*, and Laying them on *Heapes*, (which is much vsed,) is no good *Husbandry*; For that they would keep the *Ground* Warme. 599

The Sixth *Helpe* 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 serueth onely for *Meadowes*, 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 trauerse to spread the *Water*. And this maketh an excellent Improuement, both for *Corne*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the Fatnesse of the *Earth*: But howsoeuer it profiteth much. Generally, where there are great Ouerflowes, 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*, til the *Weeds* and *Sedge* be growne vp; For then the *Ground* will be like a Wood, which keepeth out the Sunne; And so continueth the Wet; Whereby it will neuer graze (to purpose) that yeare. Thus much for *Irrigation*. But for *Anoydances*, and *Drayuings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, wee shall speake of them in another Place. 600

NATV-

NATVRALL HISTORIE.

VII. Century.

THe *Differences* betweene *Animate* and *Inanimate Bodies*, we shall handle fully vnder the *Title* of *Life*, and *Liuing Spirits*, and *Powers*. We shall therefore make but a briefe Mention of them in this Place. The Maine *Differences* are two. All *Bodies* haue *Spirits*, and *Pneumaticall Parts* within them: But the Maine *Differences* betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all *Continued* with themselues, and are *Branched* in *Veines*, and secret *Canales*, as *Bloud* is: And in *Liuing Creatures*, the *Spirits* haue not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not peruious one to another; As *Aire* is in *Snow*. The Second Maine *Difference* is, that the *Spirits* of *Animate Bodies*, are all in some degree, (more or lesse,) kindled and inflamed; And haue a fine *Commixture* of *Flame*, and an *Aëriall Substance*. But *Inanimate Bodies* haue their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* consisteth not in the *Heat* or *Coolenesse* of *Spirits*; For *Cloues* and other *Spices*, *Naphtha* and *Petroleum*, haue exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those Weake and Temperate *Bodies* come to

Experiments in Consort, touching the *Affinities*, and *Differences*, betweene *Plants* and *Inanimate Bodies*.

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to be Inflamed, then they gather a much greater *Heat*, than others haue *Vn-inflamed*; besides their *Light*, and *Motion*, &c.

602 The *Differences*, which are *Secundary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They haue an *Accretion*, but no *Alimentation*. Thirdly, *Plants* haue a *Period* of *Life*; which *Inanimate Bodies* haue not. Fourthly, they haue a *Succession*, and *Propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

603 The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold Inanimate,) are these: First, *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part aboue *Earth*, and part vnder *Earth*.

604 There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Nearest of both *Kindes*: Another is *Vitriol*, for that is apteſt to sprout with *Moisture*.

605 Another speciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it dissolue not in *Arefaction*) will in the end issue into *Plants*, or *Liuing Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushromes*, and *Agaricke*, and other of those kindes, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselues, and a Number of other things, after a *Mouldinesse*, or *Rottennesse*, or *Corrupting*, they will tall to breed *Wormes*. These *Putrefactions*, which haue *Affinitie* with *Plants*, haue this *Difference* from them; That they haue no *Succession* or *Propagation*, though they *Nourish*, and haue a *Period* of *Life*, and haue likewise some *Figure*.

606 I left once, by chance, a *Citron* cut, in a close Roome, for three Summer-Moneths, that I was absent; And at my Returne, there were grown forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would haue beene some *Herbe*.

Experiments in Consort touching the *Affinities*, and *Differences*, of *Plants*, and *Liuing Creatures*: And the *Confiners* and *Participles* of them.

The *Affinities* and *Differences* betweene *Plants* and *Liuing Creatures*, are these that follow. They haue both of them *Spirits Continued*, and *Branched*, and also *Inflamed*: But first in *Liuing Creatures*, the *Spirits* haue a *Cell* or *Seat*, which *Plants* haue not; As was also formerly said: And secondly, the *Spirits* of *Liuing Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. 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 *Liuing Creatures* are seuered, and of themselues. Secondly, *Liuing Creatures* haue *Locall Motion*; *Plants* haue not. Thirdly, *Liuing Creatures* nourish from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Roots*. Fourthly, *Plants* haue their *Seed* and *Seminall Parts* vppermost; *Liuing Creatures* haue

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haue them lower-most: And therefore it was said, not elegantly alone, but Philosophically; *Homo est Planta inuersa; Man is like a Plant turned vpwards:* For the *Root* in *Plants*, is as the *Head* in *Liuing Creatures*. Fifthly, *Liuing Creatures* haue a more exact *Figure* than *Plants*. Sixthly, *Liuing Creatures* haue more *Diuersity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* haue. Seuenthly, *Liuing Creatures* haue *Sense*, which *Plants* haue not. Eighthly, *Liuing Creatures* haue *Voluntary Motion*, which *Plants* haue not.

For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Peony*, *Female-Peony*; *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 neare, incline the One to the other: In ſo much as, (that which is more ſtrange,) they doubt not to report, that to keepe the *Trees* vpright from Bending, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enioyed by the *Contact* of a *Middle Body*. But this may be Feigned, or at leaſt Amplified. Neuertheleſſe, I am apt enough to thinke, that this ſame *Binarium* of a Stronger and a Weaker, like vnto *Masculine* and *Feminine*, doth hold in all *Liuing Bodies*. It is confounded ſometimes; As in ſome *Creatures* of *Putrefaction*, wherein no *Markes* of *Diſtinction* appeare: And it is doubled ſometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in moſt *Species*. 608

The *Particples* or *Confiners* betweene *Plants* and *Liuing Creatures*, are ſuch chiefly, as are *Fixed*, and haue no *Local Motion* of *Remoue*, though they haue a *Motion* in their *Parts*; Such as are *Oyſters*, *Cockles*, and ſuch like. There is a Fabulous Narration, that in the *Northerne Countries*, there ſhould be an *Herbe* that groweth in the likeneſſe of a *Lambe*, and feedeth vpon the *Graſſe*, in ſuch ſort, as it will bare the *Graſſe* round about. But I ſuppoſe, that the *Figure* maketh the *Fable*; For ſo we ſee, there be *Bee-Flowers*, &c. And as for the *Graſſe*, it ſeemeth the *Plant*, hauing a great *Stalke* and *Top*, doth prey vpon the *Graſſe*, a good way about, by drawing the *Iuyce* of the *Earth* from it. 609

Experiments Prerogatiues touching Plants.

The *Indian Fig* boweth his *Roots* downe ſo low, in one yeare, as of it ſelfe it taketh *Root* againe: And ſo multiplieth from *Root to Root*; Making of one *Tree* a kinde of *Wood*. The *Cauſe* is the *Plenty* of the *Sap*, and the *Softneſſe* of the *Stalke*, which maketh the *Bough*, being ouer-loaden, and not ſtiffely vpheld, weigh downe. It hath *Leaues*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cauſe* is, for that the Continual Shade increaſeth the *Leaues*, and abateth the *Fruit*; which neuertheleſſe is of a pleaſant Taſte. And that (no doubt) is cauſed, by the *Sappleneſſe* and *Gentleneſſe* of the Iuyce of that *Plant*, being that which maketh the *Boughes* alſo ſo Flexible. 610

It is reported by one of the *Ancients*, that there is a certaine *Indian* 611

Tree, hauing few, but very great, *Leaues*, 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 poure out the *Sap* so fast, as they haue no leisure, either to diuide into many *Leaues*, or to put forth *Stalks* to the *Fruit*. With vs *Trees* (generally) haue small *Leaues*, in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the Least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaues* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The *Cause* is, (like to that of the *Indian Fig*,) the hasty and plentifull Putting forth of the *Sap*.

612 There be three *Things* in vse for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little vsed. It is found in *Canes*: *Quere*, whether to the first *Knuckle*, or further vp? And whether the very *Barke* of the *Cane* it selfe do yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I haue heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that he hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a forthnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported also by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleyes of *Hyrcania*, that distilleth *Honey* in the *Mornings*. It is not vnlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may be also, that some sweet Iuyces, fit for many vses, may be concocted out of *Fruits*, to the Thicknesse of *Honey*, or perhaps of *Sugar*; The likeliest are *Raisins* of the Sunne, *Figs*, and *Corrans*: The Meanes may be enquired.

613 The *Ancients* report of a *Tree*, by the *Persian Sea*, vpon the *Shore-Sands*, which is nourished with the *Salt-Water*; And when the *Tide* ebbeth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*,) & grasping the *Sands* like a *Crab*; Which neuertheless beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Seruice-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

614 There be of *Plants*, which they vse for *Garments*, these that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter, commonly; And sometimes the *Downe* that groweth aboue.

615 They haue, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepeth*. There be *Sleepers* enow then; For almost all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that haue a *Mossy* or *Downy Root*; And likewise that haue a Number of *Threds*, like *Beards*; As *Mandrakes*; wherof *Witches* and *Impostours* make an vgly *Image*, giuing it the Forme of a *Face* at the *Top* of the *Root*, and leaue those *Strings* to make a broad *Beard* downe to the Foot. Also there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doues* foot.

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 Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth vpwards, and downwards, putteth forth in Round.

There are some *Teares* 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 *Teare* commeth forth, and hangeth vpon their *Beards*: Of this Sort is some kinde of *Ladanum*. 617

The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewise with *Roots*; For vpon *Seeds* it worketh no great Effects. 618

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessells*. But if the *Vessells* be not very Great, you must make some Holes in the Bottome, to giue some Refreshment to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate. 619

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thriue: Neither did it loue the Sunne: There might be one *Cause* of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quære* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things. 620

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, anb Breeding *Wormes*, the *Wormes* doe deuoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter. 621

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than we know any; For there haue beene *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *Wilde-Vines*; For the *Vines*, that they vse for *Wine*, are so often Cut, and so much Digged and Dressed, that their *Sap* spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twigges*, while they are greene, so brittle, yet the *Wood* dryed is extreme Tough; And was vsed by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgells*. 622

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading vpon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make tryall, whether *Plants* that vse to be borne vp by Props, will not put forth greater *Leaues*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Iuy*, *Wood-bine*, &c. 623

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will giue them a Taste Ouer- 624

lushious, it were good to make Triall in *Powder* of *Sugar*; Or in *Syrrup* of *Wine* onely Boyled to Height. Both these would likewise be tried in *Orenges*, *Limons*, and *Pomgranats*; For the *Powder* of *Sugar*, and *Syrrup* of *Wine*, will serue for more times than once.

625 The *Conseruation* of *Fruit* would be also tried in *Vessells*, filled with *fine Sand*, or with *Powder* of *Chalke*; Or in *Meale* and *Flower*; Or in *Dust* of *Oake-wood*; Or in *Mill*.

626 Such *Fruits*, as you appoint for *Long Keeping*, you must gather before they be full *Ripe*; And in a *Faire* and *Dry Day*, towards *Noone*; And when the *Wind* bloweth not *South*; And when the *Moone* is vnder the *Earth*; And in *Decrease*.

627 Take *Grapes*, and hang them in an *Empty Vessell*, well Stopped; And set the *Vessell*, not in a *Cellar*, but in some dry *Place*; And it is said, they will last long. But it is reported by some, they will keepe better, in a *Vessell* halfe full of *Wine*, so that the *Grapes* touch not the *Wine*.

628 It is reported, that the *Preseruing* of the *Stalke*, helpeth to preserue the *Grape*; Especially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

629 It is reported by some of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* vnder *Water*, will keepe long.

630 Of *Herbs* and *Plants*, some are good to eat *Raw*; As *Lettuce*, *Endiue*, *Purslane*, *Tarragon*, *Cresses*, *Cucumbers*, *Muske-Melons*, *Radish*, &c. Others onely after they are *Boyled*, or haue *Passed the Fire*; As *Parsley*, *Clary*, *Sage*, *Parsnips*, *Turnips*, *Asparagus*, *Artichoakes*, (though they also being young are eaten *Raw*:) But a Number of *Herbs* are not *Esculent* at all; As *Worme-wood*, *Grasse*, *Greene-Corne*, *Centory*, *Hyssope*, *Lauender*, *Balme*, &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 haue (contrariwise) *Bitter* and *Ouer-strong Tastes*, or a *Iuyce* so Crude, as cannot be ripened to the degree of *Nourishment*. *Herbes* and *Plants*, that are *Esculent Raw*, haue *Fatnesse*, or *Sweetnesse*, (as all Esculent *Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it must be such a *Fatnesse*, (for as for *Sweet Things*, they are in effect alwayes *Esculent*,) as is not Ouer-grosse, and Loading of the *Stomach*; For *Parsnips* and *Leeks* haue *Fatnesse*; But it is too Grosse and Heauy without *Boyling*. It must be also in a Substance somewhat Tender; For we see *Wheat*, *Barley*, *Artichoakes*, are no good *Nourishment*, till they haue 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 euen some of those *Herbes*, which are not *Esculent*, are notwithstanding *Poculent*; As *Hop's*, *Broome*, &c. *Quere* what *Herbs* are good for *Drinke*, besides the two aforenamed; For that it may (perhaps) ease the Charge of *Brewing*, if they make *Beere* to require lesse *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 *Leaues*, they giue no *Nourishment*,

mus, at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oyly* and *Watry Substance* commixed,) haue more of the *Oyly Substance*; And *Leaues*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth euer in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (we see) are halfe a yeare, or more, in *Concocting*; Whereas *Leaues* are out, and Perfect in a Moneth.

Plants (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe* and *Root*. The *Cause* is, for that in *Plants*, that are not of a Fierce and Eager *Spirit*, the Vertue is increased by *Concoction*, and *Maturation*, which is euer most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilest the *Spirit* is enclosed in the *Root*; And the *Spirits* doe but weaken, and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlicke*, *Dragon*, &c. Nay there be *Plants*, that haue their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Insipide*; As *Ginger*. The *Cause* is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which vnder the *Earth* is contained and held in; But when it commeth to the *Aire*, it exhaleth. 632

The *Iuyces* of *Fruits* are either *Watry*, or *Oyly*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomgranate*, &c. And there are some others, which, though they be not in vse for *Drinke*, yet they appeare to be of the same *Nature*; As *Plummes*, *Seruices*, *Mulberries*, *Rasps*, *Oranges*, *Limons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*; 633

Poculaq; admistis imitantur vitea Sorbis.

And it may be *Heps* and *Brier-Berries* would doe the like. Those that haue *Oyly Iuyce*, are; *Oliues*, *Almonds*, *Nuts* of all sorts, *Pine-Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must obserue also that some of the *Watry Iuyces*, after they haue gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is sweet, without either *Sharpnesse*, or *Oylinesse*: Such as is the *Fig*, and the *Date*.

It hath beene noted, that most *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeares. The *Cause* (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare diuers yeares together. 634

There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are Inflammable; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoe*, though rarely. The *Cause* of all these may be, the *Closenesse* and *Solidenesse* of the *Wood*, and *Pith* of the *Oake*; Which maketh seuerall *Iuyces* finde seuerall *Eruptions*. And therefore, 635

if

if you will deuise to make any *Super-Plants*, you must euer giue the *Sap* Plentifull Rising, and Hard Issue.

636 There are two *Excrescences*, which grow vpon *Trees*; Both of them in the Nature of *Mushromes:* The one the *Romans* called *Boletus*; Which groweth vpon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we haue spoken before,) which groweth vpon the Tops of *Oakes*; Though it be affirmed by some, that it groweth also at the *Roots*. I doe conceiue, that many *Excrescences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into some *Preternaturall Substance*.

637 The greater Part of *Trees* beare *Most*, and *Best*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But some beare *Best* on the *Top-Boughes*; As *Crabs*, &c. Those that beare best below, are such, as Shade doth more good to, than Hurt. For generally all *Fruits* beare best lowest; Because the *Sap* tireth not, hauing but a short Way: And therefore in *Fruits* spred vpon *Walls*, the Lowest are the Greatest, as was formerly said; So it is the *Shade* that hindereth the *Lower Boughes*; Except it be in such *Trees*, as delight in *Shade*; Or at least beare it well. And therfore, they are either Strong *Trees*, as the *Oake*; Or else they haue large *Leaues*, as the *Wallnut* and *Fig*; Or else they grow in *Pyramis*, as the *Peare*. But if they require very much *Sunne*, they beare best on the *Top*; As it is in *Crabs*, *Apples*, *Plummes*, &c.

638 There be *Trees*, that beare best, when they begin to be *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that giue *Mast*. The *Cause* is, for that all *Trees* that beare *Mast*, haue an *Oyly Fruit*; And *Young Trees* haue a more *Watry Iuyce*, and lesse Concocted; And of the same kinde also is the *Almond*. The *Peare* likewise, though it be not *Oyly*, yet it requireth much *Sap*, and well Concocted; For we see it is a Heauy *Fruit*, and Solide; Much more than *Apples*, *Plummes*, &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 *Iuyce* is better Concocted: And wee see that *Wine* is Inflammable; So as it hath a kinde of *Oylinesse*. But the most Part of *Trees*, amongst wich are *Apples*, *Plummes*, &c. beare best when they are *Young*.

639 There be *Plants*, that haue a *Milke* in them, when they are Cut; As *Figs*, *Old Lettuce*, *Sowe-Thistles*, *Spurge*, &c. The *Cause* may be an *Inception* of *Putrefaction*; For those *Milkes* haue all an *Acrimony*; though one would thinke they should be *Lenitiue*. For if you write vpon Paper, with the *Milke* of the *Fig*, the Letters will not be seene, vntill you hold the Paper before the Fire, and then they wax Browne; Which sheweth that it is a Sharpe or Fretting *Iuyce: Lettuce* is thought Poysonous, when it is so *Old*, as to haue *Milke*; *Spurge* is a kinde of Poyson in it Selfe; And as for *Sowe-Thistles*, though Coneyes eat them, yet Sheepe and Cattell will not touch them; And besides the *Milke* of them, rubbed vpon Warts, in short time, weareth them away: Which sheweth the *Milke*

of

of them to be *Corrosiue*. We see also, that *Wheat*, and other *Corne sowen*, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is euer a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

Mushromes are reported to grow, as well vpon the *Bodies* of *Trees*, as vpon their *Roots*, or vpon the *Earth*: And especially vpon the *Oake*. The *Cause* is, for that Strong *Trees*, are towards such *Excrescences*, in the Nature of *Earth*; And therfore put forth *Mosse*, *Mushromes*, and the like. 640

There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Island Soquotra*: The *Herb Amaranthus*, (indeed,) is *Red* all ouer; And *Brasill* is *Red* in the *Wood*: And so is *Red Sanders*. That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loafe*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For wee see that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*; Because the *Iuyce* hasteneth not vp; And besides it is very *Astringent*; And therefore of Slow Motion. 641

It is reported, that *Sweet Mosse*, besides that vpon the *Apple-Trees*, groweth likewise (sometimes) vpon *Poplars*; And yet (generally) the *Poplar* is a Smooth *Tree* of *Barke*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also Sweet, and sparkleth in the Burning. *Quere* of the *Mosses* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloës*, &c. 642

The *Death* that is most without Paine, hath been noted to be, vpon the *Taking* of the *Potion* of *Hemlocke*; which in Humanity was the Forme of *Execution* of *Capitall Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* vsed, 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 conceiue it is lesse Painfull than *Opium*, because *Opium* hath Parts of *Heat* mixed. 643

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are Sweet before they ripen, and after grow Spicy. And some neuer *Ripen* to be *Sweet*; As *Tamarinds*, *Berberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former Kinde haue much and subtill *Heat*, which causeth Earely Sweetnesse; The latter haue a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath Parts of Contrary *Natures*; For it is *Sweet*, and yet *Astringent*. 644

There bee few *Herbes* that haue a *Salt Taste*; And contrariwise all *Blood* of *Liuing Creatures* hath a *Saltnesse*: The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the Originall *Taste* remaineth 645

remaineth not; For you shall haue them *Bitter*, *Sowre*, *Sweet*, *Biting*, but seldome *Salt*: But in *Liuing Creatures*, all those High *Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oyly Nature*; which is not very Susceptible of those *Tastes*; And the *Saltnesse* it selfe of *Bloud*, is but a light, and secret *Saltnesse*: And euen among *Plants*, some doe participate of *Saltnesse*, as *Alga Marina*, *Sampire*, *Scoruy-Grasse*, &c. And they report, there is, in some of the *Indian-Seas*, a *Swimming Plant*, which they call *Salgazus*, spreading ouer the *Sea*, in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Ashes* of all *Plants*, they extract a *Salt*, which they vse 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 *Herbe* putteth forth another small *Herbe* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember also I haue seene, 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 vpon a dry floare, will sprout, halfe an Inch long at least: And if it be let alone, and not turned, much more; vntill the Heart be out. *Wheat* will doe the same. Try it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Sempér-Viue*; 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 driuen: For it appareth already, by that which hath beene said, that *Earth* is not necessary to the first Sprouting of *Plants*; And we see that *Rose-Buds* set in *Water*, will Blow: Therefore try whether the *Sprouts* of such *Graines* may not be raised to a further Degree; As to an *Herbe*, or *Flower*, with *Water* onely; Or some small Commixture, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come far faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may giue some light also, that *Drinke* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Try the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then dry it, and see whether it will sprout.

648 *Malt* in the *Drenching* will swell; And that in such a manner, as after the Putting forth in Sprouts, and the drying vpon the Keele, there will be gained at least a Bushell in eight, and yet the Sprouts are rubbed off; And there will be a Bushell 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*, drawne from the *Water*, in which it was steeped.

649 *Malt* gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in

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 Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

Most *Seeds* in the Growing, leaue their *Huske* or *Rinde* about the *Root*; 650
But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The *Cause* may be, for that the *Skin* or *Huske* is not easie to breake; As we see by the Pilling of *Onions*, what a Holding *Substance* the *Skin* is.

Plants, that haue *Curled Leaues*, doe all abound with *Moisture*; Which 651
commeth so fast on, as they cannot spread themselues Plaine, 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 growne, and *Cabbage-Lettuce*.

It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Putrified*, 652
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 downwards deepe into 653
the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Ash*, *Cypresse-Tree*, *Oliue*, &c. The *Cause* of this latter may be, for that such *Trees* as loue the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot vp much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, vnder *Ground*, to auoid Recesse from the *Sunne*, maketh them spread the more. And wee see it commeth to passe in some *Trees*, which haue beene planted too deepe in the *Ground*, that for loue of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And wee see also, that the *Oliue* is full of *Oylie Iuyce*; And *Ash* maketh the best Fire; And *Cypresse* is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loueth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they haue so much *Heat* in themselues, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that haue the same difference; As the *Herbe* they call *Morsus Diaboli*; Which putteth the *Root* downe so low, as you cannot pull it vp without *Breaking*; Which gaue Occasion to the *Name*, and *Fable*; For that it was said, it was so wholesome a *Root*, that the *Deuill*, when it was gathered, bit it for *Enuy*: And some of the *Ancients* doe report, that there was a Goodly *Firre*, (which they desired to remoue whole,) that had a *Root* vnder *Ground* eight Cubits deepe; And so the *Root* came vp broken.

It hath beene obserued, that a *Branch* of a *Tree*, being *Vnbarked* some 654
space at the Bottome, and so set into the *Ground*, hath growen; Euen of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, aboue

Ground, will die. The *Cauſe* may be, for that the *Vnbarkt Part* draweth the Nouriſhment beſt, but the *Barke* continueth it only.

655 *Grapes* will continue *Freſh*, and *Moiſt*, all Winter long, if you hang them, *Cluſter* by *Cluſter*, in the *Roofe* of a *Warme Roome*; Eſpecially, if when you gather the *Cluſter*, you take off with the *Cluſter* ſome of the *Stocke*.

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 *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughs*, though many *Stalkes* come out of one *Root*. It differeth much in Greatneſſe; The ſmalleſt being fit for Thatching of Houſes; And Stopping the Chinkes of Ships; Better than Glew, or Pitch. The Second Bigneſſe, is vſed for Angle-Rods, and Staues; And in *China* for beating of Offenders vpon the Thighs. The differing *Kindes* 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 *Blood*, is of differing *Natures*. Some more *Watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thicke*; As *Apples*. Some *Gummie*; As *Cherries*. Some *Froathie*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* ſeemeth to be (almoſt) towards the *Barke* only; 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 haue the *Moiſteſt Iuyces* in their *Fruit*, haue commonly the *Moiſteſt Sap* in their *Body*; For the *Vines* and *Peares* are very *Moiſt*; *Apples* ſomewhat more *Spongie*: The *Milke* of the *Figge* hath the Qualitie of the *Rennet*, to gather *Cheeſe*: And ſo haue 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 Triall, 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 haue the *Veines* more varied, and chamlotted; As *Oake*, whereof *Wainſcot* is made; *Maple*, whereof *Trenchers* are made: Some more ſmooth, as *Firre*, and *Walnut*: 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 Vſe; As *Oake*, *Cedar*, and *Cheſnut*, are the beſt Builders: Some are beſt for *Plough-Timber*; As *Aſh*: Some for *Peeres*, that are ſometimes wet, and ſometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Desks*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moiſt Grounds*; For that maketh the *Timber* Tough, and not apt to riſt with *Ordnance*; Wherein *Engliſh* and *Iriſh Timber* are thought to excell: Some for *Maſts* of *Ships*; As *Firre*, and *Pine*, becauſe of their Length,

Length, Straightneſſe, and Lightneſſe: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Aſh*: And ſo of the reſt.

The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is ſometimes *Caſuall*: For many haue beene tranſlated, and haue proſpered well; As *Damaske-Roſes*, that haue not beene knowne in *England* aboue an hundred yeares, and now are ſo common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerly *Naturall*; As the *Firre* and *Pine* loue the *Mountaines*; The *Poplar*, *Willow*, *Sallow*, and *Alder*, loue *Riuers*, and *Moiſt Places*: The *Aſh* loueth *Coppices*; But is beſt in *Standards* alone: *Iuniper* loueth *Chalke*; And ſo doe moſt *Fruit-Trees*: *Sampire* groweth but upon *Rocks*: *Reeds* and *Oſiers* grow where they are waſhed with *Water*: The *Vine* loueth Sides of *Hills*, turning vpon the *South-Eaſt Sun*, &c. 659

The *Putting forth* of certaine *Herbs* diſcouereth of what Nature the *Ground* where they put forth, is: As *wilde Thyme* ſheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* ſhew *Grounds* fit for Wood: *Camomill* ſheweth Mellow *Grounds* fit for *Wheat*. *Muſtard Seede*, growing after the *Plough*, ſheweth a good *Strong Ground* alſo for *Wheat*: *Burnet* ſheweth good *Meadow*: And the like. 660

There are found, in diuers *Countries*, ſome other *Plants*, that grow out of *Trees* and *Plants*, beſides *Miſſeltoe*: As in *Syria*, there is an *Herbe* called *Caſſytas*, that groweth out of tall *Trees*, and windeth it ſelfe about the ſame *Tree* where it groweth; And ſometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewiſe an *Herbe* called *Faunos*, vpon the *Wilde Oliue*. And an *Herbe* called *Hippophaſton* vpon the *Fullers Thorne*; Which, they ſay, is good for the *Falling-Sickneſſe*. 661

It hath beene obſerued, by ſome of the *Ancients*, that howſoeuer *Cold* and *Eaſterly Winds*, are thought to be great Enemies to *Fruit*; yet neuertheleſſe *South-Winds* are alſo found to doe 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 beene obſerued alſo that *Greene* and *Open Winters* doe hurt *Trees*; Inſomuch as if two or three ſuch *Winters* come together, *Almond-Trees*, and ſome other *Trees*, will dye. The *Cauſe* is the ſame with the former, becauſe the *Luſt* of the *Earth* ouerſpendeth it ſelfe; Howſoeuer ſome other of the *Ancients* haue commended *Warme Winters*. 662

Snowes, lying long, cauſe a *Fruitfull Yeare*: For firſt, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) ſucke the *Water*, as out of the *Teate*. 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*, doe good to all *Succulent* and *Moiſt Fruits*; As *Vines*, *Oliues*, *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 664

Parching Heats come not vpon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not ſo faſt vpon them: And we ſee, euen in *Watring* by the *Hand*, it is beſt, in *Summer time*, to water in the *Euening*.

665 The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth eaſilieſt *Soften*, is commended; And yet ſome *Earth* of that kinde will be very Dry, and Hard before the *Showers*. The *Earth* that caſteth vp from the *Plough*, a Great *Clod*, is not ſo good, as that, which caſteth vp a Smaller *Clod*. The *Earth*, that putteth forth *Moſſe* eaſily, and may bee called *Mouldy*, is not good. The *Earth*, that ſmelleth well vpon the Digging, or Ploughing, is commended; As containing the *Iuyce* of *Vegetables* almoſt already prepared. It is thought by ſome, that the *Ends* of low *Raine-Bowes*, fall more vpon one kinde of *Earth* than vpon another: As it may well be; For that that *Earth* is moſt Roſcide: And therfore it is commended for a Signe of good *Earth*. The *Pooreneſſe* of the *Herbs*, (it is plaine,) ſhew the *Pooreneſſe* of the *Earth*; And eſpecially if they be in *Colour* more darke: But if the *Herbs* ſhew *Withered*, or *Blaſted* at the Top, it ſheweth the *Earth* to be very *Cold*: And ſo doth the *Moſſineſſe* of *Trees*. The *Earth*, whereof the *Graſſe* is ſoone *Parched* with the *Sun*, and *Toaſted*, is commonly *Forced Earth*, and Barren in his owne Nature. The *Tender*, *Cheſſome*, and *Mellow Earth*, is the beſt; Being meere *Mould*, betweene the two Extreames of *Clay*, and *Sand*; Eſpecially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will ſcarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaning*, and full of *Iuyce*.

666 It is ſtrange, which is obſerued by ſome of the *Ancients*, that *Duſt* helpeth the *Fruitfulneſſe* of *Trees*; And of *Vines*, by name: Inſomuch as they caſt Duſt vpon them of purpoſe. It ſhould ſeeme, 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*, beare the beſt *Vines*.

667 It is commended by the *Ancients*, for an Excellent *Helpe* to *Trees*, to lay the *Stalks* and *Leaues* of *Lupines* about the *Roots*; Or to Plough them into the *Ground*, where you will ſowe *Corne*. The *Burning* alſo of the *Cuttings* of *Vines*, and *Caſting* them vpon *land*, doth much Good. And it was generally receiued of old, that the *Dunging* of *Grounds*, when the *Weſt Wind* bloweth, and in the *Decreaſe* of the *Moone*, doth greatly helpe; The *Earth* (as it ſeemeth) being then more thirſty, and open, to receiue the *Dung*.

668 The *Graſting* of *Vines* vpon *Vines*, (as I take it,) is not now in vſe: The *Ancients* had it, and that three wayes: The Firſt was *Inſition*, which is the Ordinary Manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and Putting in the *Cions* 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 *Corne*, are worthy to be enquired; And

And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mildew* is one of the Greatest; which (out of question) commeth by *Closeneſſe* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it ſeldome commeth; Such as is with vs *York's Wold*. This cannot be remedied, otherwiſe than that in *Countries* of Small Encloſure, the *Grounds* be turned into larger *Fields:* Which I haue knowne to doe good in ſome Farmes. Another *Diſeaſe* is the *Putting forth* of *Wilde Oats*, whereinto *Corne* oftentimes, (eſpecially *Barley*,) doth degenerate. It happeneth chiefly from the *Weakneſſe* of the *Graine* that is ſowen; For if it be either too Old, or Mouldy, it will bring forth *Wilde Oats*. Another *Diſeaſe* is the *Saciety* of the *Ground*; For if you ſow one *Ground* ſtill with the ſame *Corne*, (I meane not the ſame *Corne* that grew vpon the ſame *Ground*,) but the ſame *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c.) it will proſper but poorely: 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 *Flowring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with vs is rare; But in Hotter *Countries*, common: Inſomuch as the Word, *Calamitas*, was firſt deriued from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Ouer-wet* at *Sowing-Time*; which with vs breedeth much *Dearth*; Inſomuch as the *Corne* neuer commeth vp; And (many times) they are forced to reſow *Sommer-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 vpon Hot *Sunnes*, 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 Choake, and Ouerſhadow the *Corne*, and beare it downe; Or ſtarue the *Corne*, and deceiue it of Nouriſhment. Another *Diſeaſe* is, *Ouer-Ranckneſſe* of the *Corne*; Which they vſe to remedy, by *Mowing* it after it is come vp; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Haruest*. Another ill *Accident* is, if the *Seed* happen to haue touched *Oyle*, or any *Thing*, that is *Fat*; For those *Subſtances* haue an *Antipathy* with *Nouriſhment* of *Water*.

The *Remedies* of the *Diſeaſes* of *Corne* haue beene obſerued as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preſeruatiue:* The *Mingling* of *Seed-Corne* with *Aſhes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* ſound: It hath not beene practiſed, but it is thought to be of vſe, to make ſome *Miſcellane* in *Corne*; As if you ſow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath beene obſerued, that the *Sowing* of *Corne* with *Houſleeke*, doth good. Though *Graine*, that toucheth 670

toucheth *Oyle*, or *Fat*, receiueth hurt, yet the *Steeping* of it, in ithe *Dregs* of *Oyle*, when it beginneth to Puttrifie, (which they call *Amurca*,) is thought to assure it against *Wormes*. It is reported also, that if *Corne* be *Mowed*, it will make the *Graine* Longer, but Emptier, and hauing More of the *Huske*.

671 It hath beene noted, that *Seed* of a yeare 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 *Seeds* 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*.

672 It hath beene obserued, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Insomuch as it hath bin knowne to go three Cubits deepe; 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 Herbe*, that (as it seemeth) loueth the *Earth*, and is not much drawne by the *Sunne*.

673 It hath beene obserued, that some *Herbs* like best, being watred with *Salt-Water*; As *Radish*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674 It is strange that is generally receiued, how some *Poysonous Beasts* affect *Odorate* and *Wholesome Herbs*; As that the *Snake* loueth *Fennell*; That the *Toad* will be much vnder *Sage*; That *Frogs* will be in *Cinque foile*. It may be, it is rather the *Shade*, or other Couerture, that they take liking in, than the Vertue of the *Herbe*.

675 It were a Matter of great Profit, (saue that I doubt it is too Coniecturall to venture vpon,) if one could discerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the Yeare: For as for those, that are like to be in *Plenty*, they may be bargained for, vpon 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 beleeued to make a *Fruitfull Yeare* of *Corne*: An *Earely Winter*, or a very *Late Winter*, a *Barren Yeare* of *Corne*: An Open and Serene *Winter*, an ill Yeare of *Fruit*: These we haue partly touched before: But other *Prognostickes* of like Nature are diligently to be enquired.

676 There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Oliue* hath the *Oyly Part*, only on the *Outside*; Wherias all other *Fruits* haue it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines Kernells*. The *Pomigranate* and *Pine-Apple* haue onely, amongst *Fruits*, *Graines* distinct in seuerall *Cells*. No *Herbs* haue *Curled Leaues*, but *Cabbage*, and *Cabbage-Lettuce*. None haue double *Leaues*, one belonging to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichoke:* No *Flower* hath that kinde of Spread that the *Woodbine* 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 happeneth oft, and may be much diuersified: In others, such as happeneth rarely, and admitteth little Variety: For so it is likewise in *Beasts: Dogs* haue a Resemblance with *Wolues*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Bustes*; *Hares* with *Coneyes*; &c. And so in *Birds: Kites* and *Kestrells* haue a Resemblance with *Hawkes*; *Common-Doues* with *Ring-Doues*, and *Turtles*; *Black-Birds* with *Thrushes*, and *Mauisses*; *Crowes* with *Rauens*, *Dawes*, and *Choughes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird* of *Paradise*, and the *Peacocke* amongst *Birds*; And some few others; haue scarce any other *Species*, that haue Affinity with them.

We leaue the *Description* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall History:* Wherein *Mens Diligence* hath beene great, euen to *Curiosity:* For our *Experiments* are onely such, as doe euer ascend a Degree, to the *Deriuing* of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, haue also laboured; But their *Causes*, and *Axiomes*, are so full of Imagination, and so infected with the old Receiued *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

Experiment Solitary touching *Healing of Wounds.* 677

It hath beene obserued, by some of the *Ancients*, that *Skins*, (especially of *Rams*,) newly pulled off, and applied to the *Wounds* of *Stripes*, doe keepe them from Swelling, and Exulcerating; And likewise Heale them, and Close them vp; And that the *Whites* of *Eggs* do the same. The *Cause* is a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viscous, and doe bridle the *Defluxe* of *Humours* to the Hurts, without Penning them in too much.

Experiment Solitary, touching *Fat diffused in Flesh.* 678

You may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into Peeces, and put the Peeces into a *Glasse* couered with Parchment; And so let the *Glasse* stand six or seuen Houres in *Boyling Water*. It may be an *Experiment* of Profit, for Making of *Fat*, or *Grease*, for many vses; But then it must be of such *Flesh* as is not Edible; As *Horses*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

It

Experiment Solitary, touching *Ripening* of *Drink* before the *Time*.

679

It is reported by one of the *Ancients*, that *New Wine*, put into *Vessells* well stopped, and the *Vessells* let downe into the *Sea*, will accelerate very much, the Making of them Ripe, and Potable. The same would be tried in *Wort*.

Experiment Solitary, touching *Pilosity* and *Plumage*.

680

Beasts are more *Hairy* than *Men*; And *Sauage Men* more than *Ciuill*; And the *Plumage* of *Birds* exceedeth the *Pilosity* of *Beasts*. The *Cause* of the Smoothnesse in *Men*, 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 whatsoeuer assimilateth, goeth not into the *Haire*:) And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Sauage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and excerne more than *Beasts*: For their *Excrements* are euer liquid, and their *Flesh* (generally) more dry: Besides, they haue not *Instruments* for *Vrine*; And so all the *Excrementitious Moisture* goeth into the *Feathers*: And therefore it is no Maruell, though *Birds* bee commonly better Meat than *Beasts*, because their *Flesh* doth assimilate more finely, and secerneth more subtilly. Againe, the *Head* of *Man* hath *Haire* vpon 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 solide Substance, nourisheth and assimilateth lesse, and excerneth more: And so likewise doth the *Chinne*; We see also that *Haire* commeth not vpon the *Palmes* of the *Hands*, nor *Soales* 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 *Quicknesse* 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 Bulke of their Body, than in *Beasts*: For as for the Reason that some giue, that they are partly Carried, whereas *Beasts* goe, that is Nothing; For by that Reason Swimming should be swifter, than Running: And that Kinde of *Carriage* also, is not without Labour of the *Wing*.

Experiment Solitary, touching the different *Clearenesse* 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 *Oylinesse* in the *Surface* thereof; As appeareth in very Hot Daies: And againe, for that the *Southerne Wind* relaxeth the *Water* somewhat; As no *Water Boyling* is so Cleare as *Cold Water*.

Experiment Solitary touching the different *Heats* of *Fire* and *Boiling Water*.

683

Fire burneth *Wood*, making it first *Luminous*; Then *Blacke* 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

And the *Emission*, first the *Fragilitie*, 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 againe wee 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 *Egges Boyled*, and *Roasted*, (into which the *Water* entreth not at all,) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

Experiment Solitary touching the *Qualification* of *Heat* by *Moisture*. 684

The *Bottome* of a *Vessell* of *Boyling Water*, (as hath beene observed,) is not very much *Heated*; So as Men may put their *Hand* vnder the *Vessell*, and remoue it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth Coales, where it entreth; So it doth allay Heat, where it toucheth: And therefore note well, that *Moisture*, although it doth not passe 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 wee see in this *Instance*: And wee 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*: Wee see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay wee see more, that *Butter*, or *Oyle*, which in themselues are Inflammable, yet by Vertue of their *Moisture*, will doe the like.

Experiment Solitary, touching *Yawning*. 685

It hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the Inner *Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary, touching the *Hiccough*. 686

It hath beene observed by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough*, is a *Lifting vp* of the *Stomacke*; which *Sneezing* doth somewhat depresse, and diuert the *Motion* another way. For first wee see, that the *Hiccough* commeth of *Fulnesse* of *Meat*, (especially in *Children*,) which causeth an Extension of the *Stomacke*: Wee see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceased, either by *Diuersion*; Or by *Detention* of the *Spirits*: *Diuersion*, as in *Sneezing*; *Detention*, as wee see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an Earnest Studie doth the like; As is commonly vsed: And *Vinegar* put to the *Nosthrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirits*.

Experiment Solitary, touching *Sneezing.* 687

Looking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nosthrills*; For then the *Holding* vp of the *Nosthrills* against the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nosthrills*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nosthrills* within, doth draw the *Moisture* to the *Nosthrills*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene obserued, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they run with Water, will preuent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Nosthrills*, is diuerted to the *Eyes*.

Experiment Solitary, touching the *Tendernesse* of the *Teeth.* 688

The *Teeth* are more, by *Cold Drinke*, 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 *Bloud*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore wee see, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in Sharpe *Colds* wax *Brittle*; And therefore, it hath beene seene, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiment Solitary, touching the *Tongue.* 689

It hath beene noted, that the *Tongue* receiueth, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blacknesse* of the *Tongue*. Againe, *Pied Cattell* are spotted in their *Tongues*, &c. The *Cause* is, (no doubt,) the *Tendernesse* of the *Part*; which thereby receiueth more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment Solitary, touching the *Taste.* 690

When the *Mouth* is out of *Taste*, it maketh Things taste, sometimes *Salt*; Chiefly *Bitter*; And sometimes *Loathsome*; But neuer *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathsome*; But *Sweet* neuer; For the rest are *Degrees* of *Corruption*.

Experiment Solitary touching some *Prognostickes* of *Pestilentiall Seasons.* 691

It was obserued in the *Great Plague* of the last Yeare, that there were seene, in diuers *Ditches*, and low *Grounds*, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (vsually) haue no *Tailes* at all. Which argueth a great Disposition to *Putrefaction* in the *Soile*, and *Aire*. It is reported likewise, that *Roots*, (such as *Carrets*, and *Parsnips*,) are more *Sweet*, and *Lushious*, in Infectious Yeares, than in other Yeares.

Experiment Solitary touching *Speciall Simples* for *Medicines.* 692

Wise *Physitians* should with all diligence inquire, what *Simples* Nature yeeldeth, that haue extreme *Subtile Parts*, without any *Mordication*, or

or *Acrimony*: For they Vnderminne that which is *Hard*; They open that which is *Stopped*, and *Shut*; And they expell that which is *Offensiue*, gently, without too much *Perturbation*. Of this Kinde are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this kinde is the *Dwarfe-Pine*; which is Proper for the *Iaundies*: Of this kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this kinde is *Piony*; which is Proper for *Stoppings* in the *Head*: Of this kinde is *Fumitory*; which is Proper for the *Spleene*: And a Number of Others. Generally, diuers *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snailes*, &c. And I conceiue, that the *Trochisches* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of *Beasts Putrified*; (as *Castoreum*, and *Muske*, which haue extreme *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefactions* of *Plants*, (as *Agarieke*, and *Iewes-Eare*,) are of greatest Vertue. The *Cause* is, for that *Putrefaction* is the Subtillest of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Liues* of *Liuing Creatures*, (which some of the *Paracelsians* say (if they could be taken downe,) would make vs *Immortall*;) the Next is for *Subtilty* of *Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

It hath beene obserued by the *Antients*, that *Much Vse* of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are vnable to generate, are (neuertheless) also *Dimme Sighted*. The *Cause* of *Dimnesse* of *Sight*, in the Former, is the *Expence* of *Spirits*: In the Latter, the *Ouer-moisture* of the *Braine*: For the *Ouer-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* concurreth as another *Cause*: we see also that *Blindnesse* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the Swelling of their Thighes, the Loosenesse of their Belly, the Smoothnesse of their Skinne, &c. Experiments in Consort touching *Venus*. 693

The *Pleasure* in the *Act* of *Venus* is the greatest of the *Pleasures* of the *Senses*: The Matching of it with *Itch* is vnproper; 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 Seuerall *Species* of *Motions*, and *Pleasures*, or *Displeasures* thereupon, as there be *Diuersities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of seuerall frame; And so are the Parts for Generation. Therefore *Cardiger* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*; And if there were any other differing *Organs*, and Qualified *Perforations*, for the *Spirits* to passe; there would be more than the *Fiue Senses*: Neither doe we well know, whether some *Beasts*, and *Birds*, haue not *Sanses* that we know not: And the very *Sent* of *Dogs* is almost a *Sense* by itselfe. Secondly, the *Pleasures* of the *Touch*, are greater and 694

deeper, than those of the other *Senses*; As we see in *Warming* vpon *Cold*; Or *Refrigeration* vpon *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*, wee see their great and sudden Effect in fetching *Men* againe, when they swoune: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkennesse*, is next the *Pleasure* of *Venus:* And *Great Ioyes* (likewise) make the *Spirits* moue, and touch themselues: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

695 It hath beene alwayes obserued, 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*, and calleth them forth; the *Winter* doth dull them. Futthermore, the *Abstinence*, or *Intermission* of the *Vse* of *Venus*, in *Moist* and *well Habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is euident; For that it is a Principall *Euacuation*, especially of the *Spirits:* For of the *Spirits*, there is scarce any *Euacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments in Consort touching the *Insecta*.

The *Nature* of *Viuification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceiued, in Small, than in Great; and in vnperfect, than in perfect, and in Parts, than in whole: So the *Nature* of *Viuification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Disclosing* the *Originall* of *Viuification*. Secondly, in *Disclosing* the *Originall* of *Figuration*. Thirdly, in *Disclosing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in *Traducing*, by way of *Operation*, some *Obseruations* in the *Insecta*, to worke *Effects* vpon *Perfect Creatures*. Note that the word *Insecta*, agreeth not with the Matter, but we euer vse it for Breuities sake, intending by it *Creatures bred of Putrefaction*.

696 The *Insecta* are found to breed out of seuerall *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 Preserue it selfe: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions*

ons of *Nourishment*. Some breed in *Wood*, both Growing, and Cut down. *Quare* in what *Woods* most, and at what Seasons? We see that the *Worms* with many Feet, which round themselues into Balls, are bred chiefly vnder *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 *Couerture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therfore they are not *Venemous*, but (contrariwise) are held by the *Physitians* to clarifie the *Bloud*. It is obserued also that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Liuing Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat arefied by the *Haire*. The *Excrements* of *Liuing Creatures*, do not only breed *Insecta*, when they are Excerned, but also while they are in the *Body*; As in *Wormes*, whereto Children are most subiect, and are chiefly in the Guts. And it hath beene lately obserued by *Physitians*, that in many *Pestilent Diseases*, there are *Wormes* found in the vpper Parts of the Body, where *Excrements* are not, but onely *Humours Putrified*. *Fleas* breed Principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-straw* kept close, and not Aired. It is receiued that they are killed by Strewing *Worme-wood* in the *Rooms*. And it is truly obserued, that *Bitter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things*, that are *Fat*, or *Sweet*, that are apteſt to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the shape of a large white *Magget*, which is giuen as a great Dainty to *Nightingales*. The *Moath* breedeth vpon *Cloth*, and other *Lanifices*; Especially if they be laid vp dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Weuill*, bred vnder *Ground*, and that feedeth vpon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing-waters*; As the *Water-Spider*, that hath six Legs. The *Fly* called the *Gad-fly*, breedeth of somewhat that Swimmeth vpon the Top of the *Water*, and is most about *Ponds*. There is a *Worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is obserued by some of the *Ancients*,) turneth into a *Gnat*. It hath bin obserued by the *Ancients*, that there is a *Worme* that breedeth in old *Snow*, and is of Colour Reddish, and dull of Motion, and dieth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly Viuifie. And the Reason of the Dying of the *Worme*, may be the sudden Exhaling of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benummed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserued in *Cold*. It is affirmed both by *Ancient* and *Moderne Obseruation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Vitriol*,) is often cast in, to mend the working there riseth suddenly a *Fly*, which sometimes moueth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene mouing in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well

Violent

Violent Heat of *Fire*, as the *Gentle Heat* of *Liuing Creatures*, will Viuifie, if it haue Matter Proportionable. Now the great *Axiome* of *Viuification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Actiue Spirit* to be dilated; *Matter Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be *put forth*, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as euer it cooleth neuer 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 *Chymicall* Trialls. Briefly, most *Things Putrified* bring forth *Insecta* of seuerall Names; But wee will not take vpon vs now, to Enumerate them all.

697 The *Insecta* haue beene noted by the *Ancients*, to feed little: But this hath not beene diligently obserued; For *Grashoppers* eat vp the *Greene* of whole *Countries*; And *Silke-wormes* deuoure *Leaues* swiftly; And *Ants* make great Prouision. It is true, that *Creatures*, that Sleepe and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* haue Extreme Variety, but the *Similar Parts* little. It is true, that they haue, (some of them,) a *Diaphragme*, and an *Intestine*; And they haue all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long Life*: Yet *Bees* haue beene knowne to liue seuen yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to liue till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will liue and grow very long: And those that Enterchange from *Wormes* to *Flyes* in the *Summer*, and from *Flyes* to *Wormes* in the *Winter*, haue beene kept in Boxes foure yeares at the least. Yet there are certain *Flyes*, that are called *Ephemera*, that liue but a day. The *Cause* is, the Exility of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might liue longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*,) reuiue easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the *Easie Dilating* of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in Peeces; Which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698 The *Insecta* haue *Voluntary Motion*, and therefore *Imagination*; And whereas some of the *Ancients* haue said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently obserued; For *Ants* goe right forwards to their Hills; And *Bees* doe (admirably) know the way, from a Flowry Heath, two or three Miles off, to their Hiues. It may be, *Gnats*, and *Flyes*, haue their *Imagination* more mutable, and giddy, as *Small Birds* likewise haue. It is said by some of the *Ancients*, that they haue onely the *Sense* of *Feeling*; which is manifestly untrue: For if they goe forth-right to a Place, they must needs haue

Sight;

Sight: Besides they delight more in one *Flower*, or *Herbe*, than in another, and therefore haue *Taste*: And *Bees* are called with *Sound* vpon *Brasse*, and therefore they haue *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Obseruations *concerning the* Insecta, *together with the* Enumeration *of them, wee referre to that Place, where wee meane to handle the* Title *of* Animal's *in generall.*

A *Man Leapeth* better with *Weights*, in his *Hands*, than without. The *Cause* is, for that the *Weight*, (if it be proportionable,) strengtheth the *Sinnewes*, by *Contracting* them. For otherwise, where no *Contraction* is needfull, *Weight* hindereth. As wee see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, vpon the one *Horse*, more than vpon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their Raise. *Quare*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* wee intend, doth not cause the *Spirits*, as it were, to breake forth with more Force: As *Breath* also drawne, and kept in, commeth forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater Swing, are first cast backward.

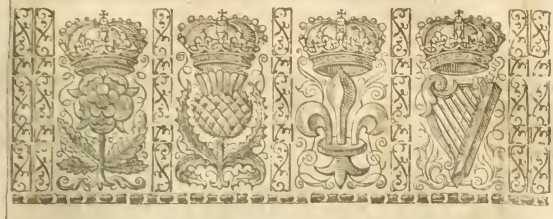
Experiment Solitary touching *Leaping*. 699

Of *Musicall Tones*, and *Vnequall Sounds*, wee haue spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Sawe*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching Noise*; make a *Shiuering* or *Horrour* in the *Body*, and set the *Teeth* on edge. The *Cause* is, for that the *Obiects* of the *Eare*, doe affect the *Spirits* (immediately) 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 *Fearefull*; But the same *Things Painted* doe little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Obiect*. So it is *Sound* alone, that doth immediately, and incorporeally, affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharpe, or Flat, if they be Sweet, haue a Roundnesse and *Equality*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Diuers Sounds Meeting*. It is true, that *Inequality*, not Stayed vpon, but Passing, is rather an Encrease of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucity* of a *Trumpet*; And in the *Nightinghale-Pipe* of a *Regall*; And in a *Discord* straight falling vpon a *Concord*: But if you stay vpon it, it is *Offensiue*; And therefore, there bee these three *Degrees* of *Pleasing*, and

Experiment Solitary, touching the *Pleasures*, and *Displeasures* of the *Senses*, especially of *Hearing*. 700

and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by diuers Names, as *Skriching*, or *Grating*, such as wee now speake of. As for the *Setting* of the *Teeth* on *Edge*, we see plainly, what an Intercourse there is, betweene the *Teeth*, and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, betweene the *Teeth*, and *Striking* vpon the *String*.

NATV-



NATVRALL HISTORIE.

VIII. Century.

Here be *Mineralls*, and *Fossiles*, in great Varietie; But of *Veines* of *Earth Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Arminus:* Whereof *Terra Lemnia* is the Chiefe. 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 haue, of all other *Simples*, the Perfectest and Purest *Qualitie* of *Drying*, with little or no Mixture of any other *Qualitie*. Yet it is true, that the *Bole-Arminicke* is the most *Cold* of them; And that *Terra Lemnia* is the most *Hot*; For which Cause, the *Island Lemnos*, where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

Experiment Solitary touching *Veines* of *Medicinall Earth*. 701

About the *Bottome* of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the sides of *Rocks*, being as it were a large, but tough, *Mosse*. It is the more to be noted, because that there be but few *Substances*, *Plant like*, that grow deepe within the *Sea*; For they are gathered sometimes fifteene Fathome deepe; And when they are laid

Experiment Solitary, touching the *Growth* of *Sponges*. 702

on Shoare, they ſeeme to be of great Bulke; But cruſhed together, will be tranſported in a very ſmall Roome.

Experiment Solitary touching *Sea-Fiſh* put in *Freſh Waters.*

703 It ſeemeth, that *Fiſh*, that are vſed to the *Salt-Water*, doe neuertheleſſe delight more in *Freſh*. Wee ſee, that *Salmons*, and *Smelts*, loue to get into *Riuers*, though it be againſt the *Streame*. At the *Hauen* of *Conſtantinople*, you ſhall haue great *Quantities* of *Fiſh* that come from the *Euxine-Sea*; that when they come into the *Freſh Water*, doe inebriate and turne vp their *Bellies*; So as you may take them with your Hand. I doubt, there hath not beene ſufficient *Experiment* made of Putting *Sea-Fiſh* into *Freſh Water*, *Ponds*, and *Pooles*. It is a Thing of great Vſe, and Pleaſure: For ſo you may haue 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 commeth, (but yet ſo, that there is a *Freſh Water* comming alſo to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment Solitary, touching *Attraction* by *Similitude* of *Subſtance.*

704 The *Turkiſh-Bow* giueth a very Forcible *Shoot*; Inſomuch as it hath beene knowne, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Braſſe* of two Inches thicke: But that which is more ſtrange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a Peece of *Wood*, of eight Inches thicke. And it is certaine, that wee had in vſe at one time, for *Sea-Fight*, ſhort *Arrowes*, which they called *Sprights*, without any other Heads, ſaue *Wood* ſharpned; which were diſcharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce. But this dependeth vpon 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 *Grauitie*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the helpe of the *Load-Stone*. But this ſame *Motion* of *Weight* or *Grauitie*, (which is a meere *Motion* of the *Matter*, and hath no Affinitie with the *Forme*, or *Kinde*,) doth kill the other *Motion*, except it ſelfe be killed by a violent *Motion*; As in theſe *Inſtances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Subſtance*, beginneth to ſhew it ſelfe. But wee ſhall handle this Point of *Nature* fully in due Place.

Experiment Solitary, touching certaine *Drinkes* in *Turkey.*

705 They haue in *Turkey*, and the *Eaſt*, certaine *Confections*, which they call *Seruetts*, which are like to *Candied Conſerues*; And are made of *Sugar* and *Limons*, 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 diſſolue in *Water*, and thereof make their *Drinke*, becauſe they are forbidden *Wine* by their *Law*. But I doe much maruell, that no *Engliſhman*, or *Dutchman*, or *German*, doth ſet vp *Brewing* in *Conſtantinople*; Conſidering they haue ſuch Quantitie of *Barley*. For as for the

the generall Sort of *Men*, Frugalitie may be the *Cause* of *Drinking Water*; For that it is no ſmall Sauing, to pay nothing for ones *Drinke* : But the better Sort mought well be at the Coſt. And yet I wonder the leſſe at it, becauſe I ſee *France*, *Italie*, or *Spaine*, haue not taken into vſe, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that ſhould begin it in *Turkey*.

Experiments in Conſort, touching *Sweat*

In *Bathing* in *Hot Water*, *Sweat* (neuertheleſſe) commeth not in the *Parts* vnder the *Water*. The *Cauſe* is ; Firſt, for that *Sweat* is a Kinde of *Colliquation*. And that Kinde of *Colliquation* is not made, either by an *Ouer-Drie Heat*, or an *Ouer-Moiſt Heat*. For *Ouer-Moiſture* doth ſomewhat extinguiſh the *Heat* ; As wee ſee that euen *Hot Water* quencheth *Fire* : And *Ouer-Drie Heat* ſhutteth the *Pores* : And therefore *Men* will ſooner *Sweat* couered before the *Sunne*, or *Fire*, than if they ſtood Naked; And *Earthen Bottles*, filled with *Hot Water*, doe prouoke, in Bed, a *Sweat* more daintily, than *Bricke-bats Hot*. Secondly, *Hot Water* doth cauſe *Euaporation* from the *Skin* ; So as it ſpendeth the Matter, in thoſe Parts vnder the *Water*, before it iſſueth in *Sweat*. Againe, *Sweat* commeth more plentifully, if the *Heat* be increaſed by *Degrees*, than if it be greateſt at firſt, or equall. 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 *Phyſitians* may doe well, when they prouoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudoriſicke Herbs* in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *leſſe Heated* firſt, and after halfe an Houre the *more Heated*. 706

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 only that *Part* which is *Separate*, and *Excerned*. *Bloud* alſo Raw hath ſome *Saltneſſe*, more than Fleſh ; becauſe the *Aſſimilation* into *Fleſh*, is not without a little and ſubtile *Excretion* from the *Bloud*. 707

Sweat commeth forth more out of the *Vpper 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 leſſe *Fleſhy*, and *Sweat* iſſueth (chiefly) out of the *Parts* that are leſſe *Fleſhy*, and more *Dry* ; As the *Forehead*, and *Breaſt*. 708

Men *Sweat* more in *Sleepe*, than *Waking* ; And yet *Sleepe* doth rather ſtay other *Fluxions*, than cauſe them ; As *Rheumes*, *Looſeneſſe* of the *Body*, &c. The *Cauſe* is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally moue inwards, and there reſt. But when they are collected once within, the *Heat* becommeth more Violent, and Irritate ; And thereby expelleth *Sweat*. 709

Cold Sweats are (many times) *Mortall*, and neere *Death* ; And alwayes *Ill*, and *Suſpected* ; As in *Great Feares*, *Hypochondriacall Paſſions*, &c. The *Cauſe* is, for that *Cold Sweats* come by a *Relaxation* or *Forſaking* of the *Spirits*, 710

Spirits, wherby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, seuereth, and issueth out.

711 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 lightneth; 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 expell the *Disease*, where it is seated, moueth to an *Expulsion* indifferent ouer all the *Body*.

Experiment Solitary, touching the *Glo-Worme*.

712 The *Nature* of the *Glo-worme* is hitherto not well obserued. Thus much we see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Wherby it may be conceiued, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the Finenesse, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Fly* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Fly* is chiefly vpon *Fens*, and *Marrishes*. But yet the two former *Obseruations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greene* of the *Fens*, giue as good Shade, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be *Winged*.

Experiments in Consort, touching the *Impressions*, which the *Passions* of the *Minde* make vpon the *Body*.

713 The *Passions* of the *Minde*, worke vpon the *Body* the *Impressions* following. *Feare* causeth *Palenesse*; *Trembling*; The *Standing* of the *Haire vpright*; *Starting*; and *Skritching*. The *Palenesse* 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 Vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth asloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that kinde, it is a *Motion* of *Shrincking*;) And likewise an *Inquisition*, in the beginning, what the Matter should be; (And in that kinde 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. *Skritching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they be vnprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* vpon *Paine*.

714 *Griefe* and *Paine* 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

Sobbing is the ſame Thing ſtronger. *Groaning*, and *Screaming*, and *Roaring*, are cauſed by an *Appetite* of *Expulſion*, as hath beene ſaid: For when the *Spirits* cannot expell the Thing that hurteth, in their Striſe to do it, by *Motion* of *Conſent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and giue ouer to reſiſt; For if one doe conſtantly reſiſt *Paine*, he will not groane. *Teares* are cauſed by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by conſequence aſtringeth the *Moiſture* of the *Braine*, 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 beare and reſiſt, and then to expell; 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 expell.

Ioy cauſeth a *Chearefulneſſe*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; 715
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 *Liuely*, and *Stirring*. We know it hath beene ſeene, that *Exceſſiue Sudden Ioy*, hath cauſed *Preſent Death*, while the *Spirits* did ſpread ſo much, as they could not retire againe. As for *Teares*, they are the Effects of *Compreſſion* of the *Moiſture* of the *Braine*, vpon *Dilatation* of the *Spirits*. For *Compreſſion* of the *Spirits* worketh an *Expreſſion* of the *Moiſture* of the *Braine*, by *Conſent*, as hath beene ſaid in *Grieſe*. But then in *Ioy*, it worketh it diuerſly; *viz.* by *Propulſion* of the *Moiſture*, when the *Spirits* dilate, and occupy more Roome.

Anger cauſeth *Paleneſſe* in ſome, and the *Going* and *Comming of the* 716
Colour in Others: Alſo *Trembling* in ſome; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fiſt*. *Paleneſſe*, and *Going*, and *Comming* of the *Colour*, are cauſed by the *Burning* of the *Spirits* about the *Heart*; Which to refreſh themſelues call in more *Spirits* from the *Outward Parts*. And if the *Paleneſſe* be alone, without *Sending forth* the *Colour* againe, it is commonly ioyned with ſome *Feare*; But in many there is no *Paleneſſe* at all, but contrariwiſe *Redneſſe* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Reuenge*. *Trembling* in *Anger* is likewiſe by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is ioyned with *Feare*. *Swelling* is cauſed, both by a *Dilatation* of the *Spirits* by *Ouer-Heating*, and by a *Liquefaction* or *Boyling* 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 *Reuenge*.

Light Diſpleaſure or *Diſlike*, cauſeth *Shaking* of the *Head*; *Frowning*, 717
and *Knitting* of the *Browes*. Theſe *Effects* ariſe from the ſame *Cauſes* that *Trembling*, and *Horrour* doe; Namely, from the *Retiring* of the *Spirits*, but in a leſſe degree. For the *Shaking* of the *Head* is but a Slow and

Definite

Definite *Trembling*; And is a *Gesture* of *Slight Refusall*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand*, which wee vse, when we refuse a Thing, or warne it away. The *Frowning*, and *Knitting* of the *Browes*, is a *Gathering*, or *Serring* of the *Spirits*, to resist in some Measure. And we see also, this *Knitting* of the *Browes* will follow vpon earnest *Studying*, or *Cogitation* of any Thing, though it bee without *Dislike*.

718 *Shame* causeth *Blushing*; And *Casting downe* of the *Eyes*. *Blushing* is the *Resort* of *Blood* to the *Face*; Which in the *Passion* of *Shame* is the *Part* that laboureth most. And although the *Blushing* will be seene in the whole *Breast*, if it be Naked, yet that is but in Passage to the *Face*. As for the *Casting downe* of the *Eyes*, it proceedeth of the *Reuerence* a Man beareth to other Men; Whereby, when he is ashamed, he cannot endure to looke firmely vpon Others: And we see that *Blushing*, and the *Casting downe* of the *Eyes* both, are more when we come before Many; *Ore Pompeij quid mollius? Nunquàm non coram pluribus erubuit*: And likewise when we come before *Great*, or *Reuerend Persons*.

719 *Pity* causeth sometimes *Teares*; And a *Flexion* or *Cast* of the *Eye* *aside*. *Teares* come from the same *Cause* that they doe in *Griefe*: for *Pity* is but *Griefe* in Anothers Behalfe. The *Cast* of the *Eye* is a *Gesture* of *Auersion*, or *Loathnesse* to behold the *Object* of *Pity*.

720 *Wonder* causeth *Astonishment*, or an *Immoueable Posture* of the *Body*; *Casting* vp of the *Eyes* to *Heauen*; And *Lifting* vp of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* vpon one *Object* of *Cogitation*, whereby it doth not spatiate and transcurre, as it vseth: For in *Wonder* the *Spirits* fly not, as in *Feare*; But onely settle, and are made lesse apt to moue. As for the *Casting* vp of the *Eyes*, and *Lifting* vp of the *Hands*, it is a *Kinde* of *Appeale* to the *Deity*; Which is the *Authour*, by *Power*, and *Prouidence*, of *Strange Wonders*.

721 *Laughing* causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interiection* 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 vnderstood, that *Laughing* is scarce (properly) a *Passion*, but hath his *Source* from the *Intellect*; For in *Laughing* there euer 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 deepe an *Impression* as in other *Passions*. And therefore, (that which hath no *Affinity* with the *Passions* of the *Minde*,) it is moued, and that in great vehemency, onely by *Tickling* some *Parts* of the *Body*: And we see that *Men* even in a *Grieued State* of *Minde*, yet cannot sometimes forbeare *Laughing*. Thirdly, it is euer ioyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinity* with *Ioy*, though it be a much *Lighter Motion*: *Res seuera est verum Gaudium*. Fourthly, that the *Object* of it is *Deformity*, *Absurdity*, *Shrew'd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these

Generall

General Notes giue 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 beene formerly touched, where we spake of the *Teares* of *Ioy* and *Griefe*,) is an Effect of *Dilatation* of the *Spirits*. And for *Suddennesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrew'd Turne* that lighteth vpon Another; Or any *Deformity*, &c. moueth *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 euen in *Tickling*, if you *Tickle* the *Sides*, and giue warning; Or giue a *Hard* or *Continued Touch*, it doth not moue *Laughter* so much.

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 generall, (For that great Vse may be made of the *Obseruation*,) that (euermore) 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 *Venereous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*. 722

It hath beene obserued by the *Ancients*, and is yet beleeued, that the *Sperme* of *Drunken Men* is *Vnfruitfull*. The *Cause* is, for that it is *Ouer-moistened*, and wanteth *Spissitude*. And we haue a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*. Experiments in Consort touching *Drunkennesse*. 723

Drunken Men are taken with a plaine *Defect*, or *Destitution* in *Voluntary Motion*. They Reele; They tremble; They cannot stand, nor speake strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate Part of the Place, where they are; And so make them Weake to moue. And therefore *Drunken Men* are apt to fall asleepe: And *Opiates*, and *Stupefactiues*, (as *Poppy*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkennesse*, by the *Grossenesse* of their *Vapour*; As *Wine* doth by the *Quantity* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey vpon it, as well as they: And so they make the *Spirits* lesse Supple, and Apt to moue. 724

Drunken Men imagine euery *Thing turneth round*; They imagine also that *Things Come vpon them*; They *See* not well *Things a farre off*; Those Things that they *See neare hand*, they *See out of their Place*; And (sometimes) they *see Things double*. The *Cause* of the Imagination that *Things turne Round*, is, for that the *Spirits* themselues turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* vpon *Compression*, turneth, as we see in *Water*:) And it is all one to the *Sight*, whether the *Visuall Spirits* moue, or the *Obiect* moueth, or the *Medium* moueth. And we see that long *Turning Round* breedeth the same Imagination. 725

The *Cause* of the Imagination that *Things come vpon them*, is, for that the *Spirits Visuall* themselues draw backe; which maketh the *Obiect* seeme to come on; And besides, when they see Things turne Round, and Moue, *Feare* maketh them thinke they come vpon them. The *Cause* that they cannot see *Things a farre off*, is the *Weaknesse* of the *Spirits*; for in euery *Megrim*, or *Vertigo*, there is an *Obtenebration* ioyned with a Semblance of *Turning round*; Which we see also in the lighter Sort of *Swounings*. The *Cause* of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The *Cause* of *Seeing Things double*, is, the *Swift* and *Vnquiet Motion* of the *Spirits*, (being Oppressed,) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Obiect*, make the same *Appearances*; And for the *Swift Motion* of the *Obiect*, we see, that if you fillip a *Lute-String*, it sheweth double, or Treble.

726 *Men* are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebrateth lesse, than *Wine Pure*. The *Cause* of the Former is, for that the *Wine* descendeth not so fast to the *Botteme* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebrateth sooner. And, for the same Reason, *Sops* in *Wine*, (Quantity for Quantity,) inebriate more, than *Wine* of it selfe. The *Cause* of the Latter is, for that the *Sugar* doth inspissate the *Spirits* of the *Wine*, and maketh them not so easie to resolue into *Vapour*. Nay further, it is thought, to be some Remedy against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken vpon much *Drinking*.

Experiment Solitary touching the *Helpe* or *Hurt* of *Wine*, though *Moderately vsed*.

The *Vse* of *Wine*, in *Dry*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The *Cause* is, for that the *Spirits* of the *Wine* doe prey vpon the *Dew*, or *Radicall Moisture*, (as they terme it,) of the *Body*, and so deceiue the *Animall Spirits*. But where there is *Moisture* Enough, or Superfluous, there *Wine* helpeth to disgest, and desiccate the *Moisture*.

727

Experiment Solitary, touching *Catterpillers*.

The *Catterpiller* is one of the most Generall of *Wormes*, and breedeth of *Dew*, and *Leaues*: For we see infinite Number of *Catterpillers*, which breed vpon *Trees*, and *Hedges*; By which the *Leaues* of the *Trees*, or *Hedges*, are in great Part consumed; As well by their Breeding out of the *Leafe*, as by their Feeding vpon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East Winds* haue much blowne: The *Cause* whereof is, the *Drinesse* of that *Wind*: For to all *Viuification* vpon *Putrefaction*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they haue *Copwebs* about them, which is a signe of a *Slimy Drinesse*: As we see vpon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all euer.

728

We

We see also the *Greene Catterpiller* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest, and the most, breed vpon *Cabbages*, which haue a *Fat Leafe*, and apt to *Putrifie*. The *Catterpiller* towards the *End* of *Summer* waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps some other *Fly*. There is a *Catterpiller*, that hath a *Furre*, or *Downe* vpon him, and seemeth to haue Affinity with the *Silke-worme*.

Experiment Solitary, touching the *Flyes cantharides*. 729

The *Flyes Cantharides* are bred of a *Worme*, or *Catterpiller*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosiue*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersiue*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no maruell though *Cantharides* haue such a *Corrosiue*, and *Cauterizing Quality*; For there is not any other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be, that the delicate-coloured *Dragon-Flies*, may haue likewise some *Corrosiue Quality*.

Experiments in Consort, touching *Lassitude*. 730

Lassitude is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warme water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* giue a *Relaxation*, or *Emollition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe 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 dischargeth *Wearinesse*; as *Sleepe* likewise doth.

731

In *Going vp a Hill*, the *Knees* will be most *Weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Lift* of the *Feet*, when a Man *Goeth vp the Hill*, the Weight of the *Body* beareth most vpon the *Knees*; And in *Going downe the Hill*, vpon the *Thighes*.

Experiment Solitary touching the *Casting* of the *Skin*, and *Shell*, in some *Creatures*. 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 euery *Casting* of the *Skin* a New *Birth*: And besides, the *Secundine* is but a generall *Couer*, 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 *Grashopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crafish*, the *Hodmandod* or *Dodman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* neuer: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the Extreme *Tenderness* and *Sofinesse* of

of the *New Shell*; And somewhat by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, though'd seeme to be the great *Quantity* of *Matter* in those *Creatures*, that is fit to make *Skin*, or *Shell*. And againe, the *Loosenesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that haue much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments in Consort touching the *Postures* of the *Body*.

733 *Lying*, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legges gathered vp*, 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 lesse Pensile: And we see, that in Weake *Stomachs*, the Laying vp of the Legs high, and the Knees almost to the Mouth, helpeth, and comforteth. We see also that *Gally-Slaues*, notwithstanding their Misery otherwise, are commonly Fat and Flesh; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is Pensile in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbes* moue more than the *Stomach*, and Belly; As in *Rowing*, and in *Sawing* being *Set*.

734 *Megrims* and *Giddinesse* 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*, fly more vp into the *Head*.

735 *Leaning long* vpon any *Part* maketh it *Numme*, and, as wee call it, Asleepe. The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to haue free Accesse; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment Solitary, touching *Pestilentiall Yeares*.

736 It hath beene noted, that those *Yeares* are *Pestilentiall*, and *Vnwholesome*, when there are great Numbers of *Frogs*, *Flies*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene 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*.

Experiment Solitary, touching the *Prognosticke* of *Hard Winters*.

737 It is an Obseruation amongst *Country-People*, that *Yeares* of *Store* of *Hawes* and *Heps*, doe commonly portend *Cold Winters*; And they ascribe it to *Gods Prouidence*, that, (as the *Scripture* saith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preseruation* 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 leaue great *Quantity* of *Cold Vapours*,

pours, not dissipate; Which causeth the *Cold* of the *Winter* following.

They haue in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as Blacke as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tauernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Disgestion*. Certainly this *Berry Coffa*; The *Root*, and *Leafe Betel*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*,) of which the *Turks* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after seuerall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betel* 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. *Quare* 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 doe inebriate, and prouoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible euer than *Leaues*.

Experiment Solitary touching *Medicines* that *Condense*, and *Releue* the *Spirits*. 738

The *Turkes* haue a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long Pencill they lay vnder their *Eye lids*, Which doth colour them Blacke; 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* vsed to paint their *Eyes*. The *Turkes* vse with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And diuers with vs, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* blacke, by Combing it, (as they say,) with a Leaden Combe, or the like. As for the *Chineses*, who are of an ill Complexion, (being Oliuaster,) they paint their *Cheekes* Scarlet; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe Naked, doe not onely paint Themselues, but they pownce and raze their Skinne, that the *Painting* may not be taken forth; And make it into Works. So doe the *West Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would haue the *Colours* of *Bird Feathers*, if they could tell how; Or at least, they will haue *Gay Skins*, in stead of *Gay Cloathes*.

Experiment Solitary, touching *Paintings* of the *Body*. 739

It is strange, that the *Vse* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and *Grecians*, it was as vsuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with vs it remaineth but as a *Part* of *Physicke*. I am of Opinion, that the Vse of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because that their *Drinking*

Experiment Solitary, touching the *Vse* of *Bathing* and *Annointing*. 740

king Water, and *Feeding* vpon *Rize*, and other Food of ſmall Nouriſhment, maketh their *Bodies* ſo Solide, and Hard, as you need not feare that *Bathing* ſhould make them *Froathie*. Beſides, the *Turkes* are great *Sitters*, and ſeldome walke; Whereby they Sweat leſſe, and need *Bathing* more. But yet certaine it is, that *Bathing*, and eſpecially *Annointing*, may be ſo vſed, as it may be a great Helpe to *Health*, and *Prolongation* of *Life*. But hereof we ſhall ſpeake in due Place, when we come to handle *Experiments Medicinall*.

Experiment Solitary, touching *Chamoletting* of *Paper*.
741

The *Turkes* haue a Pretty Art of *Chamoletting* of *Paper*, which is not with vs in vſe. They take diuers *Oyled Colours*, and put them ſeuerally (in drops) vpon *Water*; And ſtirre the *Water* lightly; And then wet their *Paper*, (being of ſome Thickneſſe,) with it; And the *Paper* will be Waued, and Veined, like *Chamolet*, or *Marble*.

Experiment Solitary, touching *Cuttle-Inke*.
742

It is ſomewhat ſtrange, that the *Bloud* of all *Birds*, and *Beaſts*, and *Fiſhes*, ſhould be of a *Red Colour*, and only the *Bloud* of the *Cuttle* ſhould be as *Blacke* as *Inke*. A Man would thinke, that the *Cauſe* ſhould be the *High Concoction* of that *Bloud*; For wee ſee in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Requeſt.

Experiment Solitary touching *Encreaſe* of *weight* in *Earth*.
743

It is reported of Credit, that if you take *Earth*, from Land adioyning to the *Riuer* of *Nile*; And preſerue it in that manner, that it neither come to be Wet, nor Waſted; And Weigh it daily, it will not alter *Weight* vntill the ſeuenteenth of *Iune*, which is the Day when the *Riuer* beginneth to riſe; And then it will grow more and more *Ponderous*, till the *Riuer* 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 beene obſerued, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loſeth Weight; And after being laid in the open *Aire*, recouereth *Weight* againe. And it ſhould ſeeme, that as ſoone as euer the *Riuer* beginneth to increaſe, the whole *Body* of the *Aire* thereabouts ſuffereth a Change: For (that which is more ſtrange,) it is credibly affirmed, that vpon that very Day, when the *Riuer* firſt riſeth, great *Plagues*, in *Cairo*, vſe ſuddenly to breake vp.

Experiments in Conſort, touching *Sleepe*.
744

Thoſe that are very *Cold*, and eſpecially in their *Feet*, cannot get to *Sleepe*. The *Cauſe* may be, for that in *Sleepe* is required a *Free Reſpiration*, which *Cold* doth ſhut in, and hinder: For wee ſee, that in great *Colds*, one can ſcarce draw his *Breath*. Another *Cauſe* may be, for that *Cold* calleth the *Spirits* to ſuccour; And therefore they cannot ſo well cloſe, and goe together in the *Head*; Which is euer requiſite to *Sleepe*. And for the ſame *Cauſe*, *Paine*, and *Noiſe* hinder *Sleepe*; And *Darkneſſe* (contrariwiſe) furtheretb *Sleepe*.

Some

Some *Noises* (whereof wee ſpake in the 112. *Experiment*) helpe *Sleepe*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cauſe* is, for that they moue in the *Spirits* a gentle *Attention*; And whatſoeuer moueth *Attention*, without too much Labour, ſtilleth the Naturall and diſcurſiue *Motion* of the *Spirits*. 745

Sleepe nouriſheth, or at leaſt preſerueth *Bodies*, a long time, without other *Nourishment*. *Beaſts* that ſleepe in *Winter*, (as it is noted of *Wilde Beares*) during their *Sleep* wax very Fat, though they Eat nothing. *Bats* haue beene found in Ouens, and other Hollow Cloſe Places, Matted one vpon another; And therefore it is likely that they *Sleepe* in the *Winter time*, and eat Nothing. *Quare*, whether *Bees* doe not *Sleepe* all Winter, and ſpare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleepe*, but lye as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, reuiue againe. A *Dormouſe*, both *Winter* and *Summer*, will *Sleepe* ſome dayes together, and eat *Nothing*. 746

Experiments in Conſert, touching *Teeth* and *Hard Subſtances* in the *Bodies* of *Liuing Creatures*.

To reſtore *Teeth* in *Age*, were *Magnale Naturæ*. It may be thought of. But howſoeuer the *Nature* of the *Teeth* deſerueth to be enquired of, as well as the other *Parts* of *Liuing Creatures Bodies*.

There be Fiue *Parts* in the *Bodies* of *Liuing-Creatures*, that are of *Hard Subſtance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; and the *Nailes*. 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 the *Maxillary Bones*; There is the *Hard Bone*, that is the *Inſtrument* of *Hearing*; And thence iſſue the *Hornes*: So that the *Building* of *Liuing Creatures Bodies*, is like the *Building* of a *Timber-Houſe*, where the *Walls*, and other *Parts* haue *Columnes*, and *Beames*; But the *Roofe* is, in the better Sort of *Houſes*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they haue Three other *Hard Subſtances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* haue *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Naile*. But no *Liuing-Creatures*, that haue *Shells* very hard; (As *Oyſters*, *Cockles*, *Muſſles*, *Scallops*, *Crabs*, *Lobſters*, *Cra-fiſh*, *Shrimps*, and eſpecially the *Tortoiſe*,) haue *Bones* within them, but onely little *Griſtles*. 747

Bones, after full Growth, continue at a Stay: And ſo doth the *Skull*: *Hornes*, in ſome *Creatures*, are caſt, and renued: *Teeth* ſtand at a Stay except their Wearing: As for *Nailes*, they grow continually: And *Bills* and *Beakes* will ouer-grow, and ſometimes be caſt; as in *Eagles*, and *Parrots*. 748

Moſt of the *Hard Subſtances* fly to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nailes*, and *Beakes*: Onely the *Bones* are more *Inward*, and clad with *Fleſh*. As for the *Entrailes*, they are all without *Bones*; Saue that a *Bone* is (ſometimes) found in the *Heart* of a *Stag*; And it may be in ſome other *Creature*. 749

The

750 The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Back-Bone* hath one Kinde of *Marrow*, which hath an Affinity with the *Braine*; And other *Bones* of the *Body* haue another. The *Iaw-Bones* haue no *Marrow* Seuered, but a little *Pulpe* of *Marrow* diffused. *Teeth* likewise are thought to haue a kind of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Bloud*. *Horne* is alike throughout; And so is the *Nail*.

751 None other of the *Hard Substances* haue *Sense*, but the *Teeth*: And the *Teeth* haue *Sense*, not onely of *Paine*, but of *Cold*.

But we will leaue the Enquiries *of other* Hard Substances, *vnto their seuerall Places*; *And now enquire onely of the* Teeth.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharpe*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betweene both. But there haue beene some *Men*, that haue had their *Teeth vndiuided*, as of one whole *Bone*, with some little Marke in the Place of the Diuision; As *Pyrrhus* had. Some *Creatures* haue *Ouer-long*, or *Out-growing Teeth*, which wee call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs* though lesse. Some *Liuing Creatures* haue *Teeth* against *Teeth*; As *Men*, and *Horses*; And some haue *Teeth*, especially their *Master-Teeth*, indented one within Another, like *Sawes*; As *Lions*; And so againe haue *Dogs*. Some *Fishes* haue diuers *Rowes* of *Teeth* in the *Roofes* of their *Mouthes*; As *Pikes*, *Salmons*, *Trouts*, &c. And many more in *Salt-Waters*. *Snakes*, and other *Serpents*, haue *Venomous Teeth*; which are sometimes mistaken for their *Sting*.

753 No *Beast* that hath *Hornes*, hath *Vpper Teeth*; And no *Beast*, that hath *Teeth* aboue, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet *è conuerso*; For *Doe's*, that haue no *Hornes*, haue no *Vpper Teeth*.

754 *Horses* haue, at three yeares old, a *Tooth* put forth, which they call the *Colts Tooth*; And at foure yeares 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, euery yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; *That the Marke is out of the Horses Mouth*.

755 The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seuen yeares old. But diuers haue *Backward-Teeth* come forth at Twenty, yea some at Thirty, and Forty. *Quare* of the manner of the *Comming* of them forth. They tell a Tale of the old *Countesse* of *Desmond*, who liued till she was seuen-score 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 Ouer-hot*; And by *Things Ouer-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

Concerning

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 *Artificiall Teeth*, where *Teeth* haue beene strucken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that giue any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are Commaterially with *Teeth*. *Quere* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to haue beene prouoked by *Art*; Therfore let *Trial* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they may be procured to come *Larger* than vsuall; As to make an *Oxe*, or a *Deere*, haue a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Brauched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and prouoked. It may be tryed also, whether *Birds* may not haue some thing done to them, when they are *Young*, wherby they may be made to haue *Greater*, or *Longer Bills*; Or *Greater* and *Longer Tallons*? And whether *Children* may not haue some *Wash*, or Some thing to make their *Teeth Better*, and *Stronger*? *Corall* is in vse as an Helpe to the *Teeth* of *Children*.

Experiments in Consort, touching the *Generation* and *Bearing* of *Liuing Creatures* in the *Wombe*.

758

Some *Liuing Creatures generate* but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And most Sorts of *Birds*, and *Fishes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domesticke Creatures*; As *Horses*, *Hogges*, *Dogges*, *Cats*, &c. The *Cause* of *Generation* at *all Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* 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*, *Dogges*, &c. which breed at all Seasons, are full of *Heat*, and *Moisture*; *Doues* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Doue* almost continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearefulnesse*; and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildnesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a dry *Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going* to *Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Earely about the Middle of *September*, they goe to Rut somewhat the sooner; If *Drought*, somewhat the later. So *Sheepe*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at cer-

taine *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 certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of Generation: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest shee is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Egges*, or *Young Ones*, out of the *Neasts* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759 Of *Liuing Creatures*, some are *Longer time* in the *Wombe*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six Moneths; *Doe's* goe about nine Moneths; *Mares* eleuen Moneths; *Bitches* nine Weekes; *Elephants* are said to goe two Yeares; For the Receiued *Tradition* of ten Yeares is *Fabulous*. For *Birds* there is double Enquiry; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds*, there is lesse *Diuersity* of *Time*, than amongst other *Creatures*; yet some there is: For the *Hen* sitteth but three Weekes; The *Turky-Hen*, *Goose*, and *Ducke*, a Moneth: *Quare* of others. The *Cause* of the great *Difference* of *Times*, amongst *Liuing Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Wombe*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *Wombe*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *Wombe*, are long time in *Comming* to their full *Growth*. But in most other Kindes, the *Constitution* of the *Wombe*, (that is, the *Hardnesse* or *Drinesse* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure yeares of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three Quarters of a yeare, are but nine Weekes in the *Wombe*. As for *Birds*, as there is lesse Diuersity, amongst them, in the time of their *Bringing forth*; So there is lesse Diuersity in the time of their *Growth*; Most of them comming to their *Growth* within a Twelue-Moneth.

760 Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &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 if lesse be required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *Wombe*, which may seuer 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 *Bottome* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottome* of the *Water*. I haue heard of a Practise, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diner* Diueth, hauing his *Eyes* open, and swimmeth vpon his *Backe*;

Backe; whether (I say) he seeth *Things* in the *Aire* greater, or lesse. 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.

It would be well boulted out, whether great *Refractions* may not be made vpon *Reflexions*, as well as vpon *Direct Beames*. For Example, We see that take an *Empty Basen*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Basen*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basen* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Basen* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beauty*, and *Strangenesse*, were a fine Proofe: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cesterne* or *Poole* of *Water*, you shall place ouer against it a *Picture* of the *Deuill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Deuills Picture* aside, not seeing the *Water*, it will looke like a *Deuill* indeed. They haue an old Tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeples*: Which was thought to be done by *Glasses*, when he walked vpon the *Ground*. 762

Experiments in Consort, touching *Impulsion*, and *Percussion*.

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, Partly because *Motion* doth discusse the *Torpour* of *Solide Bodies*; Which beside their *Motion* of *Grauity*, haue in them a *Naturall Appetite*, not to moue at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* vpon which it resteth, a stronger *Compression* of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weighty Body* be Pensile, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very neare as easily, as if it were already in *Motion*. 763

A *Body Ouer-great*, or *Ouer-small*, will not be throwne so farre, as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *Proportion*, betweene the *Body Moued*, and the *Force*, to make it moue well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moueth*, and the *Resistance* of the *Body* that is *Moued*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too small*, it resisteth too little. 764

It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid vpon a *Body*, as Falling, or strucken from aboue. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moued*, haue by *Impulsion*, or by the *Motion* of *Grauity continued*, a *Compression* in them, as well downwards, as they haue when they are throwne, or Shot thorow the *Aire*, 765

forwards. I conceiue also, that the quicke *Loose* of that *Motion*, preuenteth the *Resistance* of the *Body* below; And *Priority* of the *Force*, (alwaies,) is of great *Efficacy*; As appeareth in infinite *Instances*.

Experiment Solitary, touching *Titillation*.
766

Tickling is most in the *Soles* of the *Feet*, and vnder the *Arme-Holes*, and on the *Sides*. The *Cause* is, the *Thinnesse* of the *Skin* in those *Parts*; Ioyned with the Rarenesse of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinnesse* of the *Skin*, and *Suddennesse*, and *Rarenesse* of *Touch*, doe further: For we see, a *Feather*, or a *Rush*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddennesse*; We see no *Man* can tickle himselfe: Wee see also, that the *Palme* of the *Hand*, though it hath as *Thinne* 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 *Titillation*; For vpon *Tickling*, we see there is euer a *Starting*, or *Shrinking* away of the Part, to auoid it; And we see also, that if you Tickle the *Nostrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is euer Painfull, and not well endured.

Experiment Solitary, touching the *Scarcity* of *Raine* in *Ægypt*.
767

It is strange, that the *Riuer* of *Nilus*, Ouer-flowing, as it doth, the *Country* of *Ægypt*, there should be neuertheless little or no *Raine* 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 vnto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*; Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *Waters* vpon the Fire doe vapour so much, after some time of Boyling, 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 *Hypochondriacall Melancholy*; Which sheweth it is *Lenefying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without Shade, either of *Woods*, or *Hills*; Whereby the *Sunne* must needs haue great Power to *Concoct* it. As for the *Aire*, (from whence I conceiue this Want of Showers commeth chiefly;) The *Cause* must be; for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as euer it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment Solitary, touching *Clarification*.
768

It hath beene touched in the *Title* of *Percolations*, (Namely such as are *Inwards*,) that the *Whites* of *Eggs*, and *Milke*, doe clarifie; And it is certaine, that in *Ægypt*, they prepare and clarifie the *Water* of *Nile*, by putting it into great *Iarres* of *Stone*, and Stirring it about with a few Stamped

Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessell*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

There be scarce to be found any *Vegetables*, that haue *Branches*, and no *Leaues*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Ægypt*, a *Plant* which is Long, Leauelesse, Browne of Colour, and Branched like *Corall*, saue that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts haue a Superstitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Easie Deliuerance*. Experiment Solitary touching *Plants* without *Leaues* 769

The *Crystalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pauia*, by the *Riuer Ticinum*; And the *Ashes* of a *Weed* called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria* and *Rosetta*; And is by the *Ægyptians* vsed first for Fuell; And then they crush the *Ashes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-workes*. Experiment Solitary, touching the *Materials* of *Glasse*. 770

It is strange, and well to be noted, how long *Carkasses* haue continued *Vncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Ægypt*; Hauing lasted, as is conceiued, (some of them,) three thousand yeeres. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailes*, which are the *Parts* apteſt to corrupt. But that is nothing to the Wonder: For wee see, what a Soft and Corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Obseruation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which we conceiue to be so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that Haste to *Corruption*, that is conceiued. And therefore *Bodies*, in *Shining-Amber*; In *Quicke-Siluer*; In *Balmes*, (whereof wee now speake;) In *Wax*; In *Honey*; In *Gammes*; And (it may be) in *Conseruatories* of *Snow*; &c. are preserued very long. It need not goe for Repetition, if we resume againe that which wee said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you prouide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The First is, that the *Aire* be *excluded*; For that vndermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolue it. The Second is, that the *Body Adiacent* and *Ambient* be not Commateriall, but meerely Heterogeneall towards the Body that is to be preserued: For if Nothing can be receiued by the One, Nothing can issue from the Other; Such are *Quick-Siluer*, & *White-Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserued, be not of that *Grosse*, that it may corrupt within it selfe, although no Part of it issue into the *Body Adiacent*: And therefore it must be rather *Thinne*, and *Small*, than of *Bulke*. There is a Fourth *Remedie* also, which is; Experiment Solitary touching *Prohibition* of *Putrefaction*, and the *Long Conseruation* of *Bodies*. 771

That

That if the *Body* to be preserued be of *Bulke*, as a *Corps* is, then the *Body* that Incloseth it, must haue a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Liuy* 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 foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be seene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as fresh, as if they had beene but newly Written; being written in *Parchment*, and couered ouer with *Watch-Candles* of *Wax*, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Ægyptians* were; Which was the *Cause* that the Body was vtterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Cæsar* visited the *Sepulchre* of *Alexander* the *Great*, in *Alexandria*, he found the *Body* to keepe his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so Tender, as *Cæsar* touching but the *Nose* of it, defaced it. Which maketh mee finde 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 Materiall; Namely, that the Ancient *Ægyptian Mummies*, were shrowded in a Number of Folds of *Linnen*, besmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practised vpon the *Body* of *Alexander*.

Experiment Solitary, touching the *Abundance* of *Nitre* in certaine *Sea-Shoares*.

772

Neare the *Castle* of *Catie*, and by the *Wells* of *Assan*, in the *Land* of *Idumea*, a great Part of the Way, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, vpon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

Experiment Solitary, touching *Bodies* that are *borne vp* by *Water*.

773

The *Dead-Sea*, which vomiteth vp *Bitumen*, is of that *Crassitude*, as *Liuing Bodies* bound Hand and Foot, cast into it, haue beene borne vp, and not sunke. Which sheweth, that all *Sinking* into *Water*, is but an *Ouer-Weight* of the *Body*, put into the *Water*, in respect of the *Water*: So that you may make *Water* so strong, and heauy, of *Quicke-Siluer*, (perhaps,) or the like, as may beare vp *Iron*: Of which I see no Vse, but Imposture. Wee see also, that all *Metalls*, except *Gold*, for the same reason, swimme vpon *Quicke-Siluer*.

Experiment Solitary, touching *Fuell*, that *consumeth little*, or *nothing*.

774

It is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make Fires,) which burneth like a *Coale*, and diminisheth not; But only waxeth Brighter, and Whiter. That it should doe so, is not strange; For wee see *Iron* Red Hot burneth, and consumeth not: But the Strangenesse is, that it should continue any time

time so: For *Iron*, as soone as it is out of the Fire, deadeth straight-waies. Certainly, it were a Thing of great Vse, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: Neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders Wooll*; Being a Kinde of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it 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 burne.

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 *Briar-Coale*, powred vpon *Char-Coale*, make them last longer. *Sedge* is a cheape *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea Coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-Coale-Men* vse it, priuily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be vsed purposely, and be made knowne, it is Sauing.

Experiment Solitary *Oeconomicall* touching *cheape Fuell*.

775

It is, at this Day, in vse, 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 Deuice for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italie*, 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 *Reuerberate*, and *goe round* in *Circles*, rather than this *Deuice* of *Spouts* in the *Wall*.

Experiment Solitary, touching the *Gathering* of *Wind* for *Freshnesse*.

776

There would be vsed much diligence, in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discouer the *Wholesomenesse* or *Vnwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Consitures*, 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 *Discouerie*; For they serue for a *Naturall Diuination* 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 touching the *Trials* of *Aires*.

777

There is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattell* drinke; Which maketh them giue

Experiment Solitary touching *Increa-*

ſing of Milke in Milch-Beaſts.
778

giue more *Milke*. Surely, there would be ſome better Trialls made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe* them from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the beſt.

Experiment Solitary, touching *Sand* of the *Nature* of *Glaſſe*.
779

It is reported, that in the *Valley*, neare the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which, of all other, hath moſt Affinitie with *Glaſſe*; Inſomuch 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 *Naturall Fornace*, or *Heat* in the *Earth*: And yet they doe not ſpeake of any *Eruption* of *Flames*. It were good to trie in *Glaſſe-Workes*, whether the *Crude Materialls* of *Glaſſe*, mingled with *Glaſſe*, already made, and Re-moulten, doe not facilitate the *Making* of *Glaſſe* with leſſe *Heat*.

Experiment Solitary, touching the *Growth* of *Corall*.
780

In the *Sea*, vpon the *South-Weſt* of *Sicilie*, much *Corall* is found. It is a *Sub-Marine Plant*. It hath no *Leaues*: It brancheth only when it is vnder *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the *Aire*, it becommeth *Hard*, and *Shining* Red, as wee ſee. It is ſaid alſo, to haue a *White Berry*; But wee finde it not brought ouer with the *Corall*. Belike it is caſt away as nothing worth: Inquire better of it, for the *Diſcourſie* of the *Nature* of the *Plant*.

Experiment Solitary, touching the *Gathering* of *Manna*.
781

The *Manna* of *Calabria* is the beſt, and in moſt Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of ſuch *Mulberry Trees*, as grow in the *Valley's*. And *Manna* falleth vpon the *Leaues* by *Night*, as other *Deawes* doe. It ſhould ſeeme, that before thoſe *Deawes* come vpon *Trees* in the *Valley's*, they diſſipate, and cannot hold out. It ſhould ſeeme alſo, the *Mulberry-Leafe*, it ſelfe, hath ſome Coagulating Vertue, which inſpiſſateth the *Deaw*, for that it is not found vpon other *Trees*: And wee ſee by the *Silke-Worme*, which feedeth vpon that *Leafe*, what a Dainty Smooth *Iuyce* it hath; And the *Leaues* alſo, (eſpecially of the Blacke *Mulberry*,) are ſomewhat Briſtly, which may helpe to preſerue the *Deaw*. *Certainly*, it were not amiſſe, to obſerue a little better, the *Deawes* that fall vpon *Trees*, or *Herbs*, Growing on *Mountaines*; For, it may be, many *Deawes* fall, that ſpend before they come to the *Valleys*. And I ſuppoſe, that he that would gather the beſt *May-Deaw* for *Medicine*, ſhould gather it from the *Hills*.

Experiment Solitary, touching the *Correcting* of *Wine*.
782

It is ſaid, they haue a manner, to prepare their *Greeke-Wines*, to keepe them from *Fuming*, and *Inebriating*, by adding ſome *Sulphur*, or *Allome*: Whereof the one is *Vnctuous*, and the other is *Aſtringent*. And certaine it is, that thoſe two *Natures* doe beſt repreſſe *Fumes*. This *Experiment* would be tr nſferred, vnto other *Wine*, and *Strong Beere*, by Putting in ſome like *Subſtances*, while they worke; Which may make them both to *Fume* leſſe, and to *Inflame* leſſe.

It

It is conceiued by ſome, (not improbably,) that the reaſon, why *Wilde-Fires*, (Whereof the principall Ingredient is *Bitumen*,) doe not quench with *Water*, is, for that the firſt *Concretion* of *Bitumen* is a *Mixture*, of a *Fiery*, and *Watry Subſtance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court* of *Vulcan*, you ſhall heare, vnder the *Earth*, a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth alſo *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Etna*, and *Veſuuius*, and the like, which conſiſt vpon *Sulphur*, ſhoot forth *Smoake*, and *Aſhes*, and *Pumice*, but no *Water*. It is reported alſo, that *Bitumen* Mingled with *Lime*, and Put vnder *Water*, will make, as it were, an *Artificiall Rocke*; The *Subſtance* becommeth ſo Hard.

Experiment Solitary touching the *Materiall* of *Wild-Fire*. 783

There is a *Cement*, compounded of *Floure*, *Whites* of *Egges*, and *Stone powdred*, that becommeth Hard as *Marble*; wherewith *Piſcina mirabilis*, neare *Cuma*, is ſaid to haue the *Walls* Plaſtered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *Whites* of *Egges*, and *Gumm-Dragon*, made into *Paſte*, will in a few dayes hardeſt to the Hardneſſe of a *Stone*.

Experiment Solitary, touching *Plaſter* growing as *Hard* as *Marble*. 784

It hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or Hurts in the *Leggs*, are Hard to Cure; And in the *Head* more Eaſie. The *Cauſe* is, for that *Vlcers* or *Hurts* in the *Leggs* require *Deſiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwiſe *Drineſſe* maketh them more apt to Conſolidate. And in Moderne Obſeruation, the like difference hath beene found, betweene *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 *Legge* in an *Engliſh-Man*.

Experiment Solitary, touching the *Hardneſſe* of *Vlcers* and *Hurts*. 785

It hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cauſe a *Fenourous Diſpoſition* of the *Yeare*; But with *Raine*, not. The *Cauſe* is, for that *Southerne Winds* doe, of themſelues, qualifie the *Aire*, to be apt to cauſe *Feuers*; But when *Showers* are ioyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coaſts*, becauſe the *Vapour* of the *Sea*, without *Showers*, doth refreſh.

Experiment Solitary, touching the *Healthfulneſſe* or *Vnhealthfulneſſe* of the *Southerne Wind*. 786

It hath beene noted by the *Ancients*, that *Wounds* which are made with *Braſſe*, heale more eaſily, than *Wounds* made with *Iron*. The *Cauſe* is, for that *Braſſe* hath, in it ſelfe, a *Sanatiue Vertue*; And ſo in the very Inſtant helpeth ſomewhat: But *Iron* is *Corroſiue*, and not *Sanatiue*. And therefore it were good, that the Inſtruments which are vſed by *Chirurgians* about *Wounds*, were rather of *Braſſe*, than *Iron*.

Experiment Solitary, touching *Wounds*. 787

Experiment Solitary touching *Mortification* 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 remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *Snow* Put vpon them, helpeth; For that it preserueth those *Spirits* that remaine, till they can reuiue; And besides, *Snow* hath in it a Secret *Warmth:* As the *Monke* proued out of the *Text*; *Qui dat Niuem sicut Lanam, Gelu sicut Cineres spargit.* Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Frost* did fret like *Ashes*. *Warme Water* also doth good; Because by little and little it openeth the Pores, without any sudden Working vpon the *Spirits*. This *Experiment* may be transferred vnto the *Cure* of *Gangrenes*, either Comming of themselues, 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 touching *Weight.*
789

Weigh *Iron*, and *Aqua Fortis*, seuerally; Then dissolue the *Iron* in the *Aqua Fortis:* And weigh the *Dissolution*; And you shall finde it to beare as good *Weight*, as the *Bodies* did seuerally: Notwithstanding a good deale of Wast, by a thicke *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 *Triall*.

Experiment Solitary touching the *Super-Natation* of *Bodies.*
790

Take of *Aqua-Fortis* two *Ounces*, of *Quick-siluer* two *Drachmes*; (For that Charge the *Aqua-Fortis* will beare;) The *Dissolution* will not beare a *Flint*, as big as a *Nutmeg:* Yet (no doubt) the Increasing of the *Weight* of *Water*, will increase his *Power* of *Bearing*; As we see *Broine*, when it is Salt enough, will beare an *Egge*. And I remember well a *Physitian*, that vsed to giue some Minerall *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary *Water*. But it seemeth, the *Weight* of the *Quick-siluer*, more than the *Weight* of a *Stone*; doth not compense the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment Solitary, touching the *Flying* of *Vnequall Bodies* in the *Aire.*
791

Let there be a Body of *Vnequall 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 recouer to be Forwards; Vnlesse the *Body* be Ouer-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* moueth 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* turne ouer: For (turned) it can more easily draw forward the *Lighter* Part. *Galileus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driuen faster than the *Water* can

can follow, the *Water* gathereth vpon an heape, 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* ouer-runneth 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 them with equall Force, you cannot possibly throw the *Wood*, so farre, as the *Stone*, or *Iron*.

Experiment Solitary, touching *Water*, that it may be the *Medium* of *Sounds*.

792

It is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottome* of the *Water*, it maketh a *Sound*. So a long *Pole* strucke vpon *Grauell*, in the *Bottome* of the *Water*, maketh a *Sound*. Nay, if you should thinke that the *Sound* commeth vp by the *Pole*, and not by the *Water*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no Solide *Body*, whereby the *Sound* can ascend.

Experiment Solitary, of the *Flight* of the *Spirits* vpon *Odious Obiects*.

793

All *Obiects* of the *Senses*, which are very *Offensiue*, doe cause the *Spirits* to retire; And vpon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horrour*. 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* Shiuer. For *Tastes*, we see that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Necke* shake. For *Odious Smells*, the like Effect followeth, which is lesse perceiued, because there is a Remedy at hand, by Stopping of the *Nose*: But in *Horses*, that can vse no such Help, we see the *Smell* of a *Carrion*, especially of a *Dead 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 *Chilnesse* or *Shiuering* in all the *Body*. And euen in *Sight*, which hath (in effect) no *Odious Obiect*, Comming into *Sudden Darknesse*, induceth an *Offer* to *Shiuer*.

Experiment Solitary, touching the *Super-Reflexion* of *Eccho's*.

794

There is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath Windownes onely from aboue: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neare Fifty; Hauing a *Doore* in the Middest. It reporteth the *Voice*, twelue or thirteene times; if you stand by the Close *End-Wall*, ouer against the *Doore*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* soundeth, as if it came from aboue the *Doore*. And if you stand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you stand in the *Doore*, or in the *Middest* iust ouer against the *Doore*, not. Note that all *Eccho's* sound better against *Old walls*, than *New*; Because they are more *Dry*, and *Hollow*.

Experiment Solitary touching the *Force of Imagination, Imitating* 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 *Soure* or *Acide Things*, which set the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that hee that seeth the *Thing* done by another, hath his owne *Teeth* also set on edge. So if a Man see another turne swiftly, and long; Or if he looke vpon *Wheeles* that turne, Himselfe waxeth *Turne-sicke*. So if a Man be vpon an *High Place*, without *Railes*, or good Hold, except he be vsed to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many vpon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, Themselues are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment Solitary, touching *Preservation* of *Bodies*.

796

Take a *Stocke-Gilly-Flower*, and tye it gently vpon a Sticke, and put them both into a *Stoope Glasse*, full of *Quick-siluer*, so that the *Flower* be couered: Then lay a little *Weight* vpon the Top of the *Glasse*, that may keepe the Sticke downe; And looke vpon them after foure or fiue daies; And you shall finde the *Flower* Fresh, and the *Stalke* 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 preserue excellently in *Quick-siluer*; And not preserue only, but, by the *Coldnesse* of the *Quick-siluer*, *Indurate*; For the *Fresbnesse* of the *Flower* may be meerely *Conseruation*; (which is the more to be obserued, because the *Quick-siluer* presseth the *Flower*;) But the *Stiffenesse* of the *Stalke*, cannot be without *Induration*, from the Cold (as it seemeth,) of the *Quick-siluer*.

Experiment Solitary, touching the *Growth*, or *Multiplying* of *Metalls*.

797

It is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the Ground, if it be well *Watred*, will increase into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increase; As hath beene seene in *Old Statua's* of *Stone*, which haue beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time,) there appeared, that the *Lead* did swell; Insomuch as it hanged vpon the *Stone* like *Warts*.

Experiment Solitary, touching the *Drowning* of the *more Base Metall* in the *more Pretious*.

798

I call *Drowning* of *Metalls*, when that the *Baser Metall*, is so incorporate with the more *Rich*, as it can by no Meanes be separated againe: which is a kinde of *Version*, though False: As if *Siluer* should be inseparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Siluer*. The Ancient *Electrum* had in it a Fifth of *Siluer* to the *Gold*; And made a *Compound Metall*, as fit for most vses, as *Gold*; And more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe priuily, or to make the *Compound* passe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it be done Auowedly, and without Disguizing, it may be a great *Sauing* of the

the *Richer Metall*. I remember to haue heard of a Man, skilfull in *Metalls*, that a Fifteenth Part of *Siluer*, incorporate with *Gold*, will not be Recouered by any *Water* of *Separation*; Except you put a Greater *Quantity* of *Siluer*, 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 thinke on. This would be better enquired; And the *Quantity* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Siluer* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Siluer*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take so much the more *Siluer*, as will counteruaile the *Ouer-Weight* of the *Lead*.

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficulty. The *Melting* sheweth that it is not Ieiune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Concerauation* of them: Whereby they haue the lesse Appetite, and no Meanes (at all) to issue forth. It were good therefore to try, whether *Glasse Re-moulten* doe leese any *Weight*? For the *Parts* in *Glasse* are euenly 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 *Smalnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which haue little, or no *Spirit*: So as there is nothing to fly out; As wee see in the *Stuffe*, where of *Coppells* are made; Which they put into *Furnaces*; Vpon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The *Euen Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closenesse* of the *Tangible Parts*; And the *Ieiunenesse* or *Extreme Comminution* of *Spirits*: Of which Three, the Two First may be ioyned with a *Nature Liquefiable*; The Last not.

Experiment Solitary touching *Fixation* of *Bodies*.

799

It is a Profound *Contemplation* in *Nature*, to consider of the *Emptinesse*, (as we may call it,) or *Insatisfaction* of seuerall *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 kinde of Thirst, as not satisfied with his owne former Consistence; For else it would neuer receiue them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receiue *Dry* and more *Terrestriall Bodies*, Proportionable: And *Dry Bodies*, on the other side, drinke in *Waters*, and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Watry Substances*,) *One is a Glue to another*. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themselues be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Ashes*; Nor apparently Porous: *Metalls* themselues doe receiue in readily *Strong-Waters*; And *Strong-Waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-Water* will touch vpon *Gold*, that will not touch vpon *Siluer*; And *è conuerso*. And *Gold*, which

Experiment Solitary, touching the *Restlesse Nature* of Things in *Themselues*, and their *Desire* to *change*.

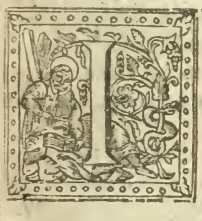
800

which seemeth by the *Weight*, to be the Closest, and most Solide *Body*, doth greedily drinke in *Quick-Siluer*. And it seemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Consent. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentiuely; For as for the Pretty Assertion, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *Wandring Notion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either, to ouercome and turne another *Body* into it Selfe, as by Victory; Or it Selfe to dye, and goe out.

NATV-

NATVRALL HISTORIE.

IX. Century.



IT is certaine, that all *Bodies* whatſoeuer, though they haue no *Senſe*, yet they haue *Perception* : For when one *Body* is applied to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate : And whether the *Body* be *Alterant*, or *Altered*, euermore a *Perception* precedeth *Operation* : For elſe all *Bodies* would be alike One to Another. And ſometimes this *Perception*, in ſome Kinde of *Bodies*, is farre more Subtill than the *Senſe* ; So that the *Senſe* is but a dull Thing in Compariſon of it : Wee ſee a *Weather-Glaſſe*, will finde the leaſt difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* alſo, is ſometimes at *Diſtance*, as well as

Experiments in Conſort, touching *Perception* in *Bodies Inſenſible*, tending to *Natural Diuination*, or *Subtill Trials*.

vpon the *Touch*; As when the *Load-Stone* draweth *Iron*; or *Flame* fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subiect* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Sense*; And sometimes Better. And besides, it is a Principall *Meanes* of *Naturall Diuination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serueth to *discouer* that which is *Hid*, as well as to *foretell* that which is to *Come*; As it is in many *Subtill Trialls*; As to trie whether *Seeds* be old, or new, the *Sense* cannot informe: But if you boile them in *Water*, the New *Seeds* will sprout sooner: And so of *Water*, the *Taste* will not discouer the best *Water*; But the *Speedy Consuming* of it, and many other *Meanes*, which we haue heretofore set downe, will discouer it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discouer those *Naturall Inclinations* of the *Minde*, which *Dissimulation* will conceal, or *Discipline* will suppresse. Wee shall therefore now handle only, those two *Perceptions*, which pertaine to *Naturall Diuination*, and *Discouery*: Leauing the Handling of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Diuination* is attained by other *Meanes*; As if you know the *Causes*; If you know the *Concomitants*; you may iudge of the *Effect* to follow: And the like may be said of *Discouery*; But wee tie our Selues here, to that *Diuination* and *Discouery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blastings*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Vnwholsome Yeares*.

801 The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*; haue beene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestilentiall 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*.

Great Droughts in *Summer*, lasting till towards the *End* of *August*, and 805
some *Gentle Showres* vpon them; And then some *Drie Weather* againe; Doe portend a *Pestilent Summer*, the *Yeare* following: For about the *End* of *August*, all the *Sweetnesse* of the *Earth*, which goeth into *Plants*, and *Trees*, is exhaled; (And much more if the *August* be dry;) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to Corrupt the *Aire*: And that *Vapour*, by the first *Showres*, if they be *Gentle*, is released, and commeth forth abundantly. Therefore they that come abroad soone after those *Showres*, are commonly taken with *Sicknesse*: And in *Affricke*, no Body will stirre out of doores, after the first *Showres*. But if the *Showres* come vehemently, then they rather wash and fill the *Earth*, than giue it leaue to breathe forth presently. But if *Drie Weather* come againe, then it fixeth and continueth the *Corruption* of the *Aire*, vpon the first *Showres* begun; And maketh it of ill *Influence*, euen to the Next *Summer*; Except a very *Frostie Winter* discharge it; Which seldome succeedeth such *Droughts*.

The *Lesser Infections*, of the *Small Pockes*, *Purple Feuers*, *Agues*, in 804
the *Summer Precedent*, and houering all *Winter*, doe portend a great *Pestilence* in the *Summer* following; For *Putrefaction* doth not rise to his height at once.

It were good to lay a *Peece* of *Raw Flesh*, or *Fish*, in the *Open Aire*; 805
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 quicke or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amisse, in the same *Yeare*, and at the same *Time*, to lay one *Peece* of *Flesh*, or *Fish*, in the *Open Aire*, and another of the same Kinde and Bignesse, within *Doores*: For I iudge, that if a generall *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 discouer, what the *Winter* hath done; And what the *Summer* following will doe vpon the *Aire*. And because the *Aire* (no doubt) receiueth great *Tincture*, and *Infusion* from the *Earth*; It were good to trie that *Exposing* of *Flesh*, or *Fish*, both vpon a *Stake* of *Wood*, some heighth aboue the *Earth*, and vpon the *Flat* of the *Earth*.

Take *May-Dew*, and see whether it putrifie quickly, or no? For that 806
likewise may disclose the *Qualitie* of the *Aire*, and *Vapour* of the *Earth*, more or lesse *Corrupted*.

A *Drie March*, and a *Drie May*, portend a *Wholesome Summer*, if there 807
be a *Showring Aprill* betweene: But otherwise, it is a *Signe* of a *Pestilentiall Yeare*.

As the *Discouerie* of the *Disposition* of the *Aire*, is good for the *Prognosticks* of *Wholesome*, and *Vnwholesome Yeares*; So it is of much more 808
vse, for the *Choice* of *Places* to dwell in: At the least, for *Lodges*, and *Retiring Places* for *Health*; (For *Mansion Houses* respect *Prouisions*, as well

as *Health*; Wherein the *Experiments* aboue mentioned may serue.

809 But for the *Choice* of *Places*, or *Seats*, it is good to make Triall, not only of *Aptnesse* of *Aire* to corrupt, but also of the *Moisture* and *Drinesse* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diuersly. Wee see that there be some *Houses*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainscoats* will also sweat more; so that they will almost run with *Water*: All which, (no doubt,) are caused chiefly by the *Moistnesse* of the *Aire*, in those *Seats*. But because it is better to know it, before a *Man* buildeth his *House*, than to finde it after, take the *Experiments* following.

810 Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would trie, comparing it with some other *Places*; And see whether it doth not moisten, and make the *Wooll*, or *Sponge*, &c. more Ponderous, than the other? And if it doe, you may iudge of that Place, as Situate in a *Grosse*, and *Moist Aire*.

811 Because it is certaine, that in some *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more Vnequall, than in Others; And *Inequalitie* of *Aire* is euer an Enemy to *Health*; It were good to take two *Weather-Glasses*, Matches in all things, and to set them, for the same Houres of One day, in seuerall *Places*, where no *Shade* is, nor *Enclosures*: And to marke, 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 *Vnequall*, 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 *Inequalitie* be, of the *Ascent*, or *Descent* of the *Water*, the greater is the *Inequalitie* of the *Temper* of the *Aire*.

812 The *Predictions* likewise of *Cold* and *Long Winters*, and *Hot* and *Drie Summers*, are good to be knowne; As well for the *Discouerie* of the *Causes*, as for diuers *Prouisions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath beene spoken of before. If *Wainscoat*, or *Stone*, that haue vsed to Sweat, be more drie, in the Beginning of *Winter*; Or the *Drops* of the *Eaues* of *Houses* come more slowly downe, than they vse; it portendeth a *Hard* and *Frostie Winter*. The *Cause* is, for that it sheweth an *Inclination* of the *Aire*, to *Drie Weather*; which in *Winter* is euer ioyned with *Frost*.

813 Generally, a *Moist* and *Coole 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 rebound vpon the *Winter*.

814 A *Hot* and *Drie Summer*, and *Autumne*, and especially if the *Heat* and *Droughts* extend farre 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 *Warme Winter* portendeth a *Hot* and *Drie Summer*: For the *Vapours* disperse into the *Winter Showres*; Whereas *Cold* and *Frost* keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

Birds that vse 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 *Northerne Countries*, with vs shew *Cold Winters*. And if it be in the same *Country*, then they shew a *Temperature* of *Season*, like vnto that *Season* in which they come: As *Swallowes*, *Bats*, *Cuckooes*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow. 816

The *Prognosticks*, more Immediate, of *Weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* vpon the *Sooare*; And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind*; shew *Wind* to follow: For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceiued, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Caues* likewise portendeth as much. 817

The *Vpper Regions* of the *Aire*, perceiue the *Collection* 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 kinde you shall finde a Number of *Instances* in our *Inquisition De Ventis*. 818

Great Mountaines haue a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *Wales*, when certaine *Hills* haue their *Night-Caps* on, they meane Mischiefe. The *Cause* is, for that *Tempests*, which are for the most part bred aboue, in the *Middle Region*, (as they call it,) are sooneſt perceiued to collect in the *Places* next it. 819

The *Aire*, and *Fire*, haue *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. Wee see the *Trembling* of a *Candle* will discouer a *Wind* that otherwise wee doe not feele; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be vnquiet; And so doe *Coales* of *Fire* by Casting off the *Ashes* more than they vse. The *Cause* is, for that no *Wind*, at the first, till it hath strooke and driuen the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to moue, than *Aire*: And for the *Ashes*, it is no maruell, though *Wind* vnperceiued shake them off; For wee vsually trie, which way the *Wind* bloweth, by casting vp *Grasse*, or *Chaffe*, or such light Things, into the *Aire*. 820

When *Wind* expireth from vnder the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof wee spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceiued by the *Sense*, vntill there be an *Eruption* of a great *Quantitie*, from vnder the *Water*; And so it getteth into a *Body*: Whereas in the first *Putting vp* it commeth in little Portions. 821

We spake of the *Ashes*, that *Coales* cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moueth, when we finde no *Wind*, 822

Wind, sheweth a *Wind* at hand: As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*.

For *Prognosticks* of *Weather* from *Liuing Creatures*, it is to be noted; That *Creatures* that Liue in the *Open Aire*, (*Sub Diô*,) must needs haue a Quicker *Impreßion* from the *Aire*, than *Men* that liue most within *Doores*; And especially *Birds*, who liue 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.

823 *Water-Fowles*, (as *Sea-Gulls*, *More-Hens*, &c.) when they flocke 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 take in the *Moistnesse*, and *Density* of the *Aire*: And so desire to be in *Motion*, and vpon the *Wing*, whither soeuer they would otherwise goe: For it is no Maruell, that *Water-Fowle* doe ioy 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* seeme to call vpon *Raine*: All which is but the Comfort they seeme to receiue in the *Relenting* of the *Aire*.

824 The *Heron*, when she soareth high, (so as sometimes she is seene to passe ouer 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*, taketh pleasure in the *Aire*, that is Condensed: And besides, being but Heauy of *Wing*, needeth the Helpe of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the *Aire*, as the *Cold* and *Freshnesse* 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* swimme against the Streame. And yet it is true also, that all *Birds* finde an Ease in the depth of the *Aire*; As *Swimmers* doe in a Deepe *Water*. And therefore when they are aloft, they can vphold themselues with their *Wings Spred*, scarce mouing them.

825 *Fishes*, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Dry*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will fly it, and *Swimme* Lower.

826 *Beasts* doe take Comfort, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get vp betimes in the Morning, to feed, against *Raine*: And *Cattell*, and *Deere*, and *Conneyes*, will feed hard before *Raine*: And a *Heifer*, will put vp his *Nose*, and snuffe in the *Aire*, against *Raine*.

The

The *Trifoile*, against *Raine*, swelleth in the *Stalke*; and so standeth more vpright; For by *Wet*, *Stalkes* doe erect, and *Leaues* bow downe. There is a Small Red *Flower* in the *Stobble-Fields*, which Country People call the *Wincopipe*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow. 827

Euen in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieue, 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*. 828

Wormes, *Vermine*, &c. doe fore-shew (likewise) *Raine*: For *Earth-wormes* will come forth, and *Moules* will cast vp more, and *Fleas* bite more, against *Raine*. 829

Solide 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 beareth backe the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe. 830

Experiment Solitary, touching the *Nature* of *Appetite* in the *Stomach*. 831

Appetite is moued chiefly by Things that are *Cold*, and *Dry*: The *Cause* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth vpon Supply; And so is *Drinesse*: And therefore all *Soure Things*, (as *Vinegar*, *Iuyce* of *Limons*, *Oyle* of *Vitriol*, &c.) prouoke *Appetite*. And the *Disease*, which they call *Appetitus Caninus*, consisteth in the *Matter* of an *Acide* and *Glossy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moued by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerues*, 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, moue *Appetite*, it is by *Vellication* of those *Nerues*; For *Motion* whetteth. As for *Worme-wood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they moue *Appetite* by *Abstersion*. So as there be foure Principall *Causes* of *Appetite*; The *Refrigeration* of the *Stomach*, ioyned with some *Drinesse*; *Contraction*; *Vellication*; And *Abstersion*: Besides *Hunger*, which is an *Emptinesse*: And yet *Ouer 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 Cholericke, which quench *Appetite* most.

Experiment Solitary, touching *Sweetnesse* of *Odour* from the *Raine-bow*. 832

It hath beene obserued by the *Ancients*, that where a *Raine-Bow* seemeth to hang ouer, or to touch, there breatheth forth a *Sweet Smell*. The *Cause* is, for that this happeneth but in certaine Matters, which haue in themselues some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *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 possibly fall, but from the *Aire*, that is very *Low*: And there-

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 preserue the Smell, being dissipated in the drawing vp: Neither doe we know, whether some *Water* it selfe, may not haue some degree of *Sweetnesse*. It is true, that wee finde it sensibly in no *Poole*, *Riuer*, nor *Fountaine*; But good *Earth*, newly turned vp, hath a *Freshnesse*, and good *Sent*; Which *water*, if it be not too *Equall*, (For *Equall Obiects* neuer moue the *Sense*,) may also haue. Certaine it is, that *Bay-Salt*, which is but a kinde of *Water Congealed*, will sometimes smell like *Violets*.

Experiment Solitary, touching *Sweet Smells*.

833 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 *Sweetnesse*: And *Flowers* growing, smell better in a *Morning*, or *Euening*, than at *Noone*. Some *Sweet Smells* are destroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pinckes*; And generally all *Flowers* that haue *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*, As *Rose-Water*, &c. Some doe scarce come forth, or at least not so pleasantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Enclosed in a *Fast Body*: But (generally) those *Smells* are the most Gratefull, where the *Degree* of *Heat* is Small; Or where the *Strength* of the *Smell* is allayed; For these *Things* doe rather wooe the *Sense*, than Satiate it. And therefore the *Smell* of *Violets*, and *Roses*, exceedeth in *Sweetnesse* that of *Spices*, and *Gummes*; And the Strongest Sort of *Smells*, are best in a west, a farre off.

Experiment Solitary touching the *Corporeall Substance* of *Smells*.

834 It is certaine, that no *Smell* issueth, but with *Emission* of some *Corporeall Substance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For wee see plainly, that *Smell* doth spread nothing that distance, that the other doe. It is true, that some *Woods* of *Orenges*, and *Heathes* of *Rose-Mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, since a *Peale* of *Ordnance* will do as much, which moueth in a small compasse? Whereas those *Woods*, and *Heathes*, are of Vast Spaces: Besides we see that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloues*, &c. which sheweth them *Corporeall*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment Solitary touching *Fetide* and *Fragrant Odours*.

835 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* thriue best, if their *Houses*, and *Stables* be kept Sweet; And so of *Cage-Birds*: And the *Cat* burieth that which shee voideth: And it holdeth chiefly in those *Beasts*, which feed vpon *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

Body it selfe reiecteth 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 *Vrine*; 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 *Fetide*, 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*, whilst it is Sound: For it is a meere dissolution of that *Forme*. Besides, there is another Reason which is Profound: And it is, that the *Obiects* that please any of the *Senses*, haue (all) some *Equality*, and (as it were) *Order*, in their *Composition:* But where those are wanting, the *Obiect* is euer Ingrate. So *Mixture* of many *Disagreeing Colours* is euer vnpleasant to the *Eye: Mixture* of *Discordant Sounds* is vnpleasant to the *Eare: Mixture*, or *Hotch-Potch* of many *Tastes*, is vnpleasant to the *Taste: Harshnesse* and *Ruggednesse* of *Bodies*, is vnpleasant to the *Touch:* Now it is certaine, that all *Putrefaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Vnformed Mixture* of the *Part*. Neuertheless, it is strange, and seemeth to Crosse the former *Obseruation*, that some *Putrefactions* and *Excrements* doe yeeld *Excellent Odours*; As *Ciuet*, and *Muske*; And as some thinke *Amber-Greece:* For diuers take it, (though vnprobably,) to come from the *Sperme* of *Fish:* And the *Mosse*, wee spake of from *Apple-Trees*, is little better than 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 ioyned with a further *Cause*, which is more Subtill; And it is, that the *Senses* loue not to be Ouerpleased; But to haue a *Commixture* of somewhat that is in it selfe Ingrate. Certainly, we see how *Discords* in *Musicke*, falling vpon *Concords*, make the *Sweetest Straines:* And we see againe, what Strange *Tastes* delight the *Taste*; As *Red-Herrings*, *Caueary*, *Parmizan*, &c. And it may be, the same holdeth in *Smells*. For those kinde of *Smells*, that we haue mentioned, are all Strong, and doe Pull and Vellicate the *Sense*. And wee finde also, that *Places* where Men *Vrine*, commonly haue some *Smell* of *Violets:* And *Vrine*, if one hath eaten *Nutmegge*, hath so too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Coniugations*; Of the *Influences* of *Heauen*; Of *Heat*, *Cold*, *Moisture*, *Drought*; *Qualities Actiue*, *Passiue*; And the like; haue swallowed vp the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to be set aside, being

but *Notionall*, and *ill Limited*; And Definite *Axiomes* are to be drawne out of *Measured Instances:* And so Assent to be made to the more *Generall Axiomes*, by *Scale.* And of these Kindes of *Processes* of *Natures*, and *Characters* of *Matter*, we will now set downe some *Instances.*

Experiment Solitary, touching the *Causes* of *Putrefaction.* 836

All *Putrefactions* come chiefly from the *Inward Spirits* of the *Body*; And partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoeuer else. And this last, by two *Meanes*: Either by *Ingresse* of the *Substance* of the *Ambient Body*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient.* As for the Receiued Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but Nugation: For *Cold* in *Things Inanimate*, is the greatest Enemy that is, to *Putrefaction*; though it extinguisheth *Viuification*, which euer consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Aduentiue Heat*, be greatly Predominant, to the *Naturall 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 *Natiue Spirits*; And also by the *Disordination*, and *Discomposture* of the *Tangible Parts*; And other *Passages* of *Nature*; And not by a *Conflict* of *Heats.*

Experiment Solitary, touching *Bodies Vnperfectly Mixt.* 837

In *Versions*, or *Maine 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*, *Smoaks*, *Vapours*, *Chylus* in the *Stomach*, *Liuing Creatures* in the first *Viuification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*,) *Inquination*, or *Inconcoction*, which is a Kinde of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment Solitary touching *Concoction* and *Crudity.* 838

The word *Concoction*, or *Digestion*, is chiefly taken into vse from *Liuing Creatures*, and their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Vrine* and *Excrements Concocted*; And the *Foure Disgestions*, (In the *Stomach*; In the *Liuer*; In the *Arteries* and *Nerues*; And in the *Seuerall 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 Obuious to *Mens Obseruations.* The Constantest *Notion* of *Concoction* is, that it should signifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to *Perfect Concoction*; Which is the *Vltimity* of that *Action*, or *Processe:* And while the *Body* to be *Conuerted* and *Altered*, is too strong for the *Efficient*, that should *Conuert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first

Forme,

Forme, or *Consistence*,) it is (all that while,) *Crude*, and *Inconcoct*; And the *Processe* is to be called *Crudity* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke* of *Heat*; But not the *Worke* of *Heat* alone: For all Things, that further the *Conuersion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conuersion* and *Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies* of *Liuing Creatures*; In which there is an *Absolute Conuersion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other, (which is *Maturation*,) is seene in *Liquours*, and *Fruits*; wherein there is not desired, nor pretended, an vtter *Conuersion*, but onely an *Alteration* to that *Forme*, which is most sought, for *Mans* vse; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there be two Kindes of *Absolute Conuersions*; The one is, when a *Body* is conuerted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which wee call *Assimilation*. The other is, when the *Conuersion* is into a *Body* meerely New, and which was not before; As if *Siluer* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conuersion* is better called, for distinctions sake, *Transmutation*.

There are also diuers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoeuer doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Maior*: As when *Meat* is Boyled, or Roasted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheese* is made of Curds, or *Butter* of *Creame*, or *Coales* of wood, or *Brickes* of Earth; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* vsed;) They be but Shifts of *Ignorance*; For *Knowledge* will be euer a *Wandring* and *Indigested Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of Instances, and those well collated.

Experiment Solitary, touching *Alterations*, which may be called *Maiors*.

839

The *Consistences* of *Bodies* are very diuers: *Dense*, *Rare*; *Tangible*, *Pneumaticall*, *Volatile*, *Fixed*; *Determinate*, *Not Determinate*; *Hard*, *Soft*; *Cleauing*, Not *Cleauing*; *Congealeable*, *Not Congealeable*, *Liquefiable*, Not *Liquefiable*, *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawen forth in length, *Intractile*; *Porous*, *Solide*; *Equall*, and *Smooth*, *Vnequall*, *Venous*, and *Fibrous*,

brow, and with *Graines*, *Entire*; And diuers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought*, is a Compendious and Inutile *Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this in our *Sylua Syluarum*: Neuertheless in some good part, We shall handle diuers of them now presently.

Experiment Solitary touching *Bodies Liquefiable*, and *not Liquefiable*.

840

Liquefiable, and *Not Liquefiable*, proceed from these *Causes*: *Liquefaction* is euer 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 haue their *Spirits* more *Sraitly Imprisoned*; Or againe that hold them *Better Pleased* 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 *Metalls*; And of the Last in *Grease*, *Pitch*, *Sulphure*, *Butter*, *Wax*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies Ieiune* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, euen many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the Forge; And a *Stecke* bathed in Hot Ashes, which thereby becommeth more Flexible. Moreouer, there are some *Bodies*, which doe *Liquefie*, or dissolue by *Fire*; As *Metalls*, *Wax*, &c. And other *Bodies*, which dissolue 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 receiue the *Liquour*. Againe, there are some *Bodies*, that dissolue with both; As *Gumme*, &c. And those be such *Bodies*, as on the One Side haue good store of *Spirit*; And on the other Side, haue 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 Receiue the *Liquour*.

Experiment Solitary touching *Bodies Fragile*, and *Tough*.

841

Of *Bodies*, some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* breake but where the *Force* is; Some shatter and fly in many Peeces. Of *Fragility* the *Cause* is an *Impotency* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Fictile Earth* is more *Fragile* than *Crude Earth*; And *Dry Wood* than *Greene*. And the *Cause* of this *Vnaptnesse* to *Extension*, is the Small *Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is euer Concomitant with *Porosity*, and with *Drinesse* in the *Tangible Parts*: *Contrariwise*, *Tough Bodies* haue more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore wee see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* scarcely.

All

All *Solide Bodies* consist of *Parts* of two seuerall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Natiue Spirit* of the *Body*; And in some other, plaine *Aire* that is gotten in; As in *Bodies deficcate*, by *Heat*, or *Age*: For in them, when the *Natiue Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are euer the more *Fragile*; For the *Natiue Spirit* is more *Yeelding*, and *Extensiue*, (especially to follow the *Parts*,) than *Aire*. The *Natiue Spirits* also admit great Diuersitie; As *Hot*, *Cold*, *Actiue*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as wee call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

Experiment Solitary, touching the *Two Kindes* of *Pneumaticals* in *Bodies*. 842

The *Concretion* of *Bodies* is (commonly) solued by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolued by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolued by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returnes* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale 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 *Oyle*, by either Meanes, 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 Congeale 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 (wee see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Ieiuenesse* of the *Spirits*; And their *Imparitie* with the *Tangible Parts*: Both which, if they be in a greater degree, maketh them, not only *Hard*, but *Fragile*, and lesse Enduring of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantitie* of *Spirits*; (which euer helpeth to Induce *Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as wee vse the word,) are of two *Kinds*; The one, that easily giueth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places*: And therefore wee see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giueth Place: For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth vp at all; But only the *depressed Part* giueth place, and the other remaineth as it was. The other, that altereth *Bulke* in the *Cession*; As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they giue place (indeed) easily, but then they rise all ouer: Which is a False *Cession*; For it is in *Place*, and not in *Body*.

Experiment Solitary, touching *Hard* and *Soft Bodies*. 844

All

Experiment Solitary touching *Bodies Ductile*, and *Tensile*.

845 All *Bodies Ductile*, and *Tensile*, (as *Metals* that will be drawne into *Wires*; *Wooll* and *Towe* that will be drawne into *Yarne*, or *Thred*,) haue in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not to *Discontinue* or forsake their owne *Body*. *Viscous Bodies*, (likewise,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese toasted*, will draw forth, and rosape. But the difference betweene *Bodies Fibrous*, and *Bodies Viscous*, is Plaine; For all *Wooll*, and *Towe*, and *Cotton*, and *Silke*, (especially raw *Silke*,) haue, besides their Desire of *Continuance*, in regard of the *Tenuitie* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to ioyne and incorporate with other *Thred*; Especially if there be a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the Practise of *Twirling* about of *Spindles*. And wee see also, that *Gold* and *Siluer Thred* cannot be made without *Twisting*.

Experiment Solitary, touching other *Passions* of *Matter*, and *Characters* of *Bodies*.

846 The *Differentes* of *Impressible* and *Not Impressible*; *Figurable* and *Not Figurable*; *Mouldable* and *Not Mouldable*; *Scissile* and *Not Scissile*; And many other *Passions* of *Matter*, are *Plebeian Notions*, applied vnto the *Instruments* and *Vses* which Men ordinarily practise; 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 vp. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Contenuitie*, 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 Quantitie*, or *Great Quantitie*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it be *Natiue Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Natiue Spirits* in the *Body*, whether they be *Actiue* and *Eager*, or *Dull* and *Gentle*. The Seuenth is the *Emission* or *Detention* 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 *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Coacerate*, or *Diffused*. The Tenth is the *Densitie*, or *Raritie* of the *Tangible Parts*. The Eleuenth is the *Equalitie* or *Inequalitie* of the *Tangible Parts*. The Twelfth is the *Digestion*, or *Cruditie* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous* or *Mercuriall*, *Watrie* or *Oylie*, *Drie* and *Terrestriall*, or *Moist* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to be *Natures Radicall*, and *Principiall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length*, or *Transuerse*; (As it is in the *Warpe*, and the *Woofe*, of *Textiles*;) *More Inward*, or *More Outward*; &c. The Fifteenth is the *Porositie*, or *Imporositie* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smalnesse* 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.

Take

Take *Lead*, and melt it, and in the Middest of it, when it beginneth to Congeale, make a little Dint, or Hole, and put *Quicke-Siluer* wrapped in a Peece of *Linnen* into that Hole, and the *Quicke-Siluer* will fix, and run 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 only to the *Vapour* of *Lead*, is lesse Probable. *Quare* 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, so they come not neere the *Fire*.

Experiment Solitary, touching *Induration* by *Sympathie*. 847

Sugar hath put downe the vse of *Honey*; Insomuch as wee haue lost those *Obseruations*, 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 *Teare* or *Bloud* issuing from the *Tree*: Insomuch as one of the *Ancients* relateth, that in *Trebisond*, there was *Honey* issuing from the *Box-Trees*, which made *Men* Mad. Againe, in Ancient time, there was a Kinde of *Honey*, which either of the owne 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 *Quantitie* of *Water*, and then strained the *Liquour*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Vessels*, for a small time; And after tunned it into *Vessels* of *Wood*, and kept it for many yeares. They haue also, at this day, in *Russia*, and those *Northerne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very Cleare. They vse also in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that wee haue lost in *Honey*, there were brought in vse a *Sugar-Mead*, (for so wee may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keepe it stale, as they vse *Mead*; For certainly, though it would not be so *Abstersiue*, and *Opening*, and *Solutiue* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitiue*, and fit to be vsed in *Sharpe Diseases*: For wee see, that the vse of *Sugar* in *Beere*, 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 Kinde of *Steele*, in some places, which would polish almost as white and bright as *Siluer*. And that there was in *India* a Kinde of *Brasse*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; But I am doubtfull, whether Men haue sufficiently refined *Metals*, which we ccunt *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Heighth? But when they come to such a Fineneſſe, as seruеth the ordinary vse, they trie no further.

Experiment Solitary, touching the *Finer Sort* of *Base Metals*. 849

There haue beene found certaine *Cements* vnder *Earth*, that are very Soft; And yet, taken forth into the *Sunne*, harden as Hard as *Marble*: There

Experiment Solitary touching *Cements* and *Quarries*. 850

There are also ordinary *Quarries* in *Sommerset-Shire*, which in the *Quarry* cut soft to any Bignesse, and in the *Building* proue firme, and hard.

Experiment Solitary, touching the *Altering* of the *Colour* of *Haires* and *Feathers*.
851

Liuing Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray*, and *White*: As is seene in *Men*, though some Earlier, some Later; In *Horses*, that are Dappled, and turne *White*; In *Old Squirrels*, that turne *Grisly*; And many Others. So doe some *Birds*; As *Cygnets*, from *Gray* turne *White*; *Hawkes*, from *Browne* turne more *White*: And some *Birds* there be, that vpon their *Moulting*, doe turne *Colour*; As *Robin-Redbrests*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* vpon the *Head*. The *Cause* is, for that *Moisture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drinesse* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *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 *Haire* of the *Head*, and doth (for the most part,) wax *Hoare* later. Out of this Ground, a *Man* may deuise the *Meanes* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this see the fifth *Experiment*.

Experiment Solitary, touching the *Differences* of *Liuing Creatures*, *Male* & *Female*.
852

The *Difference* betweene *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*, *Doues He* and *She*, and others. But some differ in *Magnitude*, and that diuersly; 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 *Quantitie*, *Crispation*, and *Colours* of them; As *He-Lions* are *Hirsute*, and haue great *Maines*; The *She's* are smooth like *Cats*. *Bulls* are more *Crispe* vpon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheasant-Cocke*, and *Gold-Finch-Cocke*, haue glorious and fine *Colours*; The *Henn's* haue not. Generally, the Hees in *Birds* haue the faiest *Feathers*. Some differ in diuers *Features*; As *Bucks* haue *Hornes*, *Doe's* none; *Rammes* haue more *wreathed Hornes* than *Ewes*; *Cocks* haue great *Combes* and *Spurres*, *Henns* little or none; *Boares* haue great *Fangs*, *Sowes* much lesse; The *Turky-Cocke* hath great and Swelling *Gills*, the *Hen* hath lesse; *Men* haue generally Deeper and Stronger *Voices* than *Women*. Some differ in *Facultie*; As the *Cocks* amongst *Singing Birds*, are the best *Singers*. The Chiefe *Cause* of all these, (no doubt,) is, for that the *Males* haue more Strength of *Heat* than the *Females*; Which appeareth manifestly in this, that all young *Creatures Males*, are like *Females*; And so are *Eunuchs*, and *Gelt Creatures* of all kinds, liker *Females*. Now *Heat* causeth *Greatnesse* of *Growth*; generally, where there is *Moisture* enough to worke vpon: But if there be found in any *Creature*, (which is seene rarely,) an Ouer-great *Heat* in proportion to the *Moisture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moisture*, then there is no *Difference* to be seene betweene *Male* and *Female*:

male: As in the *Instances* of *Horses*, and *Dogs*. Wee see also, that the *Hornes* of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* causeth *Pilosity*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which Want of *Heat* cannot Expell: And that is the *Cause* of the *Beauty* and *Variety* of *Feathers*: Againe, *Heat* doth put forth many *Excrescences*, and much Solide *Matter*, which Want of *Heat* cannot do: And this is the *Cause* of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combes* and *Spurres* of *Cocks*, *Gills* of *Turky-Cocks*, and *Fangs* of *Boares*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepnesse* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excell the *Hen*.

There be *Fishes* greater than 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 Liue not in the *Aire*, they haue not their *Moisture* drawne and Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwaies, in a manner, and are supported by the *Water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused, for that *Beasts* stay Longer time in the *Wombe*, than *Birds*, and there Nourish, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Sitting* doth *Vinifie*, and not Nourish. Experiment Solitary, touching the *Comparative Magnitude* of *Living Creatures*. 853

We haue partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this we adde further, that the *Cause* must be *Abundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Dry 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 into *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted vpon a *Colewort-Stalke*, sendeth forth a great *Apple* without a *Coare*. It is not vnlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the Iuyce came onely by the *Barke*, it would worke the *Effect*. For it hath beene obserued, that in *Pollards*, if the *Water* get in on the *Top*, and they become Hollow, they put forth the more. We adde also, that it is deliuered for certaine by some, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* haue little or no Coares, and *Stones*. Experiment Solitary, touching *Exossation* of *Fruits*. 854

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 yeare, 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 Experiment Solitary, touching the *Melioration* of *Tobacco*. 855

a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some haue 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 run his Race, can receiue much Amendment. You must euer 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 sowen vpon a *Hot Bed*, Dunged below, vpon a Bancke turned vpon the *South Sunne*, to giue *Heat* by *Reflexion*; Laid vpon *Tiles*, which increaseth the *Heat*; And Couered with *Straw* to keepe them from *Cold*. They remoue them also, which addeth some *Life:* And by these Helpes they become as good in *England*, as in *Italy*, or *Prouence*. These, and the like Meanes, may be tried in *Tobacco*. Enquire also of the *Steeping* of the *Roots*, in some such *Liquour*, as may giue them Vigour to put forth Strong.

Experiment Solitary touching seuerall *Heats*, working the same *Effects*.

856 *Heat* of the *Sunne*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vinification* of *Liuing 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 vpon the *Backes* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that haue beene drawne in at the Window of a *Kitchen*, haue sent forth *Grapes* ripe a Month (at least) before others. *Stoues*, at the Backe of Walls, bring forth *Orenges* here with vs. *Egges*, as is reported by some, haue beene hatched in the warmth of an *Ouen*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egs* vnder *Sand*, where the *Heat* of the *Sunne* discloseth them.

Experiment Solitary, touching *Swelling* and *Dilatation* in *Boyling*.

857 *Barley* in the *Boyling* swelleth not much; *Wheat* swelleth more; *Rize* extremely; In so much as a Quarter of a Pint (vnboyled) 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 *Rize* most Solide of all. It may be also that some *Bodies* haue a Kinde of *Lentour*, and more *Depertible Nature* than others; As we see it Euident in *Colouration*; For a Small *Quantity* of *Saffron*, will Tinct more, than a very great *Quantity* of *Bresill*, or *Wine*.

Experiment Solitary, touching the *Dulcoration* of *Fruits*.

858 *Fruit* groweth *Swees* by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling-Peares*, *Damasins*, &c. By *Rottennesse*; As *Medlars*, *Seruices*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine Speciall *Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roasting*, *Stewing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emollition*, which they properly enduce; As in Beating of *Stock-Fish*, *Flesh*, &c By *Rottennesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby disgest the

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 euer feed vpon the *Tangible Parts*, and attenuate them. By Seuerall *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 *Soureness* consisteth in some *Grossenesse* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which euer induceth a Milder *Taste*.

Experiment Solitary, touching *Flesh Edible*, and not *Edible*. 859

Of *Flesches*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they haue (commonly) too much *Bitternesse* of *Taste*; And therefore those *Creatures*, which are Fierce and Cholerick, are not *Edible*; As *Lions*, *Wolues*, *Squirrells*, *Dogs*, *Foxes*, *Horses*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde*, and *Fearefull*. Yet it is true, that *Horses*, which are *Beasts* of Courage, haue beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineses* eat *Horse-flesh* at this day; And some *Gluttons* haue vsed to haue *Colts-flesh* baked. In *Birds*, such as are *Carniuora*, and *Birds* of *Prey*, are commonly no Good *Meat*; But the Reason is, rather the *Cholerick Nature* of those *Birds*, than their *Feeding* vpon *Flesh*; For *Puits*, *Gulls*, *Shouelers*, *Duckes*, doe feed vpon *Flesh*, and yet are Good *Meat*: And wee see, that those *Birds*, which are of *Prey*, or feed vpon *Flesh*, are good *Meat*, when they are very Young; As *Hawkes*, *Rookes* out of the Neast, *Owles*, &c. *Mans Flesh* is not Eaten. The Reasons are Three: First, because *Men* in *Humanity* doe abhorre it: Secondly, because no *Liuing Creature*, that *Dyeth* of *it selfe*, is good to Eat: And therefore the *Caniballs* (themselues) eat no *Mans flesh*, of those that *Dye* of *Themselues*, but of such as are *Slaine*. The Third is, because there must be (generally) some *Disparity*, between the *Nourishment*, and the *Body Nourished*; And they must not be Ouer-neere, or like: Yet we see, that in great *Weaknesses*, and *Consumptions*, *Men* haue beene sustained with *Womans Milke*: And *Ficinus* sondly (as I conceiue) aduiseth, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* doe greedily eat *Mans flesh*; which if it be true, besides a *Diuellish Appetite* in them, it is likely to proceed, for that *Mans flesh* may send vp High and Pleasing *Vapours*, which may stirre the *Imagination*; And *Witches* Felicity is chiefly in *Imagination*, as hath beene said.

Experiment Solitary, touching the *Salamander*. 860

There is an Ancient Receiued *Tradition* of the *Salamander*, that it liueth in the *Fire*, and hath force also to extinguish the *Fire*. It must haue 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 annointed thicke with *White* of *Egge*, and then *Aquauita* be poured vpon 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 *Wilde-Fire*, better than *Water*, because it entreth better.

Experiment Solitary, touching the *Contrary Operations* of *Time*, vpon *Fruits*, and *Liquours*.

861 *Time* doth change *Fruit*, (as *Apples*, *Peares*, *Pomgranats*, &c.) from more *Soure*, to more *Sweet*: But contrariwise *Liquours*, (euen those that are of the *Iuyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Veriuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both Kindes, the *Spirit* is attenuated by *Time*; But in the first Kinde, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but disgest: But in *Drinkes* the *Spirits* doe raigne, and finding lesse Opposition of the *Parts*, become themselues more *Strong*; Which causeth also more Strength in the *Liquour*; Such, as if the *Spirits* be of the Hotter Sort, the *Liquour* becommeth apt to *Burne*; But in Time, it causeth likewise, when the Higher *Spirits* are Euapourated, more *Soureness*.

Experiment Solitary touching *Blowes* and *Bruises*.

862 It hath beene obserued by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters*, and *Ointments* doe enter. Surely, the *Cause*, that *Blowes* and *Bruises* enduce *Swellings*, is, for that the *Spirits* resorting to Succour the *Part* that Laboureth, draw also the *Humours* 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.

Experiment Solitary, touching the *Orris Root*.

863 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 *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to haue a Tender dainty *Heat*; Which when it commeth aboue Ground, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a Smell like a *Violet*.

Experiment Solitary touching the *Compression of Liquours*.

864 It hath been obserued by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*; And then the *Liquour* put againe into the *Vessell*; will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may be Triuiall; Namely, by the *Expence* of the *Liquour*, in regard some may sticke to the Sides of the *Bottles*: But there may be a *Cause* more Subtill; Which is, that the *Liquour* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquour* meeteth with *Liquour* chiefly; But in the *Bottles* a Small Quantity of *Liquour*, meeteth

teth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open againe.

Water, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it *Vapour*. The *Cause* is, for that *Heat*, and *Cold* haue a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such seuerall Leuity, and Grauity, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oyle* likewise lyeth at the *Top* of the *Water*, without Commixture: And a *Drop* of *Water*, running swiftly ouer a *Straw*, or *Smooth Body*, wetteth not. Experiment Solitary, touching the *Working* of *Water* vpon *Aire Contiguous*. 865

Starre-light Nights, yea and bright *Moone-shine Nights*, are *Colder* than *Cloudy Nights*. The *Cause* is, the *Drinesse* and *Fineness* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. 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 againe, *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 *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*. Experiment Solitary, touching the *Nature* of *Aire*. 866

The *Eyes* doe moue one and the same way; For when one *Eye* moueth to the *Nosthrill*, the other moueth from the *Nosthrill*. The *Cause* is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Vse* will induce the Contrary: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be set vpon a Table, with a Candle behinde them, both *Eyes* will moue Outwards; As affecting to see the *Light*, and so induce *Squinting*. Experiments in Consort, touching the *Eyes*, and *Sight*. 867

We see more exquisitely with *One Eye Shut*, than with *Both Open*. The *Cause* is, for that the *Spirits Visuall* vnite themselues more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth. 868

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 *Pellet*, held betweene two *Fingers*, laid a-crosse, seemeth *Double*. 869

Pore-blinde Men, see best in the *Dimmer Lights*; And likewise haue their *Sight* Stronger neare hand, than those that are not *Pore-blinde*; And can Reade and Write smaller *Letters*. The *Cause* is, for that the *Spirits Visuall*, in those that are *Pore blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* dispersetH them. For the same 870

Cause

Cause they need Contracting; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are; As when we see thorow a *Leuell*, the *Sight* is the Stronger: And so is it, when yon gather the *Eye-lids* somewhat close: And it is commonly seene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Reade, put the Paper somewhat a farre off. The *Cause* is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blinde Men*, vnite not, but when the *Obiect* is at some good distance, from their *Eyes*.

871 *Men* see better, when their *Eyes* are ouer-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 *Ouer-light* maketh the *Eyes* Dazell; Insomuch as Perpetuall Looking against the *Sunne*, would Cause *Blindnesse*. Againe, 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 Roome*, they seeme to haue a *Mist* before their *Eyes*, and see worse, than they shall doe, after they haue stayed a little while, either in the *Light*, or in the *Darke*. The *Cause* is, for that the *Spirits Visuall*, are vpon a Sudden Change, disturbed, and put out of Order; And till they be recollected, doe 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 Visuall*,) 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*.

872 It hath beene obserued, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The *Cause* is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seene 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 backe the *Spirits*, that ascend to them, as vnwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Deiectedly; And that *Repulsion* from the *Eyes*, Diuerteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873 The *Obiects* 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 beene said. The *Glimpses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that haue glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautifull* Person; And the like; doe delight and exhilarate the *Spirits* much. The

Reason,

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spirituall* of the *Senses*; whereby it hath no *Obiect* Grosse enough to offend it. But the *Cause* (chiefly) is, for that there be no *Actiue Obiects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Actiue*, and *Positiue*: So are *Sweet Smels*, and *Stinks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Ouer-Hot*, and *Ouer-Cold*, in *Touch*: But *Blackneſſe*, and *Darkneſſe*, are indeed but *Priuatiues*; And therefore haue little or no *Actuitie*. Somewhat they doe Contriſtate, but very little.

Water of the *Sea*, or otherwiſe, looketh *Blacker* when it is moued, and *Whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light paſſe not Straight, and therefore muſt be darkened: whereas, when it resteth, the *Beames* doe paſſe Straight. Beſides, *Splendour* hath a *Degree* of *Whiteneſſe*; Eſpecially if there be a little *Repercuſſion*: For a *Looking-Glaſſe* with the *Steele* behinde, looketh *Whiter*, than *Glaſſe Simple*. This *Experiment* deſerueth to be driuen further, in Trying by what Meanes *Motion* may hinder *Sight*.

Experiment Solitary, touching the *Colour* of the *Sea*, or other *Water*. 874

Shell-Fish haue beene, by ſome of the *Ancients*, compared and ſorted with the *Insects*; But I ſee no reason why they ſhould; For they haue *Male*, and *Female*, as other *Fish* haue: Neither are they bred of *Putrefaction*; Eſpecially ſuch as doe Moue. Neuertheleſſe it is certaine, that *Oiſters*, and *Cockles*, and *Muſſles*, which Moue not, haue no diſcriminate *Sex*: *Quære* in what time, and how they are bred? It ſeemeth that *Shells* of *Oiſters* are bred where none were before; And it is tried, that the great *Horſe-Muſſle*, with the fine ſhell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is ſtrange, it hath beene tried, that they doe not only Gape, and Shut, as the *Oiſters* doe, but Remoue from one Place to Another.

Experiment Solitary touching *Shell-Fish*. 875

The *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are Stronger. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Mouing*, are ſomewhat holpen from the *Liuer*, 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 *Limmes* are vſed moſt on the *Right Side*, whereby *Cuſtome* helpeth; For wee ſee that ſome are *Left-Handed*: Which are ſuch, as haue vſed the *Left-Hand* moſt.

Experiment Solitary, touching the *Right Side*, and the *Left*. 876

Frictions make the *Parts* more *Fleſhie*, and *Full*: As wee ſee both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantitie* of *Spirits* and *Bloud* to the *Parts*: And againe, becauſe they draw the *Aliment* more forcibly from within: And againe, becauſe they relax the *Pores*, and ſo make better *Paſſage* for the *Spirits*, *Bloud*, and *Aliment*: Laſtly, becauſe they diſſipate and diſgeſt any *Inutile* or *Excrementitious*

Experiment Solitary touching *Frictions*. 877

crementitious Moisture, which lieth in the *Flesh* : All which helpe *Assimilation*. *Frictions* also doe 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 haue noted heretofore,) *Gally-Slaues* are *Fat* and *Fleshie*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment Solitary touching *Globes* appearing *Flat* at *Distance*.
878

All *Globes* afarre off appeare *Flat*. The *Cause* is, for that *Distance*, being a *Secundary Object of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparitie* 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 *Duskish Paper* : And all *Engrauings*, and *Embossings*, (afarre off) appeare *Plaine*.

Experiment Solitary touching *Shadowes*
879

The *Vtmost Parts* of *Shadowes* seeme euer to *Tremble*. The *Cause* is, for that the little *Moats*, which wee see in the *Sunne*, doe euer Stirre, though there be no *Wind*; And therefore those Mouing, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to Moue, because the *Medium* Moueth.

Experiment Solitary touching the *Rowling* and *Breaking* of the *Seas*
880

Shallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantitie* of *Water*, and likewise *Space* Enough; there the *Water* Rowleth, and Moueth, both more Slowly, and with a Sloper Rise, and Fall: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the Bottome; there it moueth more Swiftly, and more in *Precipice*; For in the *Breaking* of the *Waues* there is euer a *Precipice*.

Experiment Solitary touching the *Dulcoration* of *Salt Water*.
881

It hath beene obserued by the *Ancients*, that *Salt-Water Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw* : And yet the *Taste* of *Salt*, in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a Kinde of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome* : And so is rather a *Separation*, than an *Euaporation*. But it is too grosse to rise into a *Vapour* : And so is a *Bitter Taste* likewise; For Simple *Distilled Waters*, of *Wormewood*, and the like, are not Bitter.

Experiment Solitary touching the *Returne* of *Saltnesse* in *Pits* vpon the *Sea-Shore*.
882

It hath beene set downe before, that *Pits* vpon the *Sea-Shoare*, 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 *Affricke*, 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 tincted with *Salt*.

Salt. The Remedie therefore is, to digge still *New Pits*, when the old wax *Brackish*; As if you would change your *Strainer*.

It hath beene obserued by the *Ancients*, that *Salt-Water*, will dissolue *Salt* put into it, in lesse time, than *Fresh Water* will dissolue it. The *Cause* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Substance*, draw the *Salt* new put in, vnto it; Whereby it diffuseth in the *Liquour* more speedily. This is a Noble *Experiment*, if it be true; For it sheweth Meanes of more Quicke and Easie *Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Trie it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Vnsugred*. Experiment Solitary touching *Attracts on* by *Similitude* of *Substance*. 883

Put *Sugar* into *Wine*, part of it aboue, part vnder the *Wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* aboue the *Wine*, will soften and dissolue sooner, than that within the *Wine*. The *Cause* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is vnder the *Wine*, by Simple *Infusion*, or *Spreading*; But that *Part* aboue the *Wine*, is likewise forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquour*, if it be Contiguous: As wee see it also in *Spunges*, put part aboue the *Water*. It is worthy the Inquiry, to see how you may make more *Accurate Infusions*, by Helpe of *Attraction*. Experiment Solitary touching *Attraction*. 884

Water in *Wells* is *warmer* in *Winter*, than in *Summer*: And so *Aire* in *Caues*. The *Cause* is, for that in the Hither *Parts*, vnder 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 Perspire, (as it doth in *Summer*,) it is the Lesse. Experiment Solitary touching *Heat* vnder *Earth*. 885

It is reported, that amongst the *Leucadians*, in *Ancient* time, vpon a Superstition, they did vse to Precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with Strings, at some distance, many great *Fowles*; And fixing vnto his *Body* diuers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare vp a good *Weight*, as they flie; And *Spreading* of *Feathers*, thinne, and close, and in great Bredth, will likewise beare vp a great *Weight*; Being euen laid, without Tilting vpon the Sides. The further *Extension* of this *Experiment* for *Flying* may be thought vpon. Experiment Solitary touching *Flying* in the *Aire*. 886

There is, in some Places, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarfe-Oake*: Vpon the *Leaues* whereof there riseth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that conuerteth (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 touching the Dye of *Scarlet*. 887

In *Zant*, it is very ordinary, to make *Men Impotent*, to accompany with Experiment Solitary tou-

ching *Maleficiating.*

888

with their *Wiues*. The like is Practised in *Gasconie*; Where it is called *Nouër l'eguillette*. It is practised alwayes vpon the *Wedding Day*. And in *Zant*, the Mothers themselues doe it, by way of Preuention; Because thereby they hinder other *Charmes*, and can vndoe their Owne. It is a Thing the *Ciuill Law* taketh knowledge of; And therfore is of no Light Regard.

Experiment Solitary, touching 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 *Bottome* of a *Basen* of *Water*; And turne the *Mouth* of the *Pot*, or *Glasse*, ouer 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 soone as it is couered, 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 Roome, as it lesseneth, the *Water* succeedeth. But vpon the *Instant* of the *Candles Going out*, there is a sudden *Rise*, of a great deale 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 *Basen*: Which sheweth, that it is not the *Flames* Drawing the *Liquour*, as *Nourishment*; As it is supposed; For all *Bodies* are alike vnto it; As it is euer in *Motion* of *Nexe*; Insomuch as I haue seene the *Glasse*, being held by the Hand, hath lifted vp the *Basen*, and all: The *Motion* of *Nexe* did so Clasp the *Bottome* of the *Basen*. That *Experiment*, when the *Basen* was lifted vp, was made with *Oyle*, and not with *Water*: Neuertheless this is true, that at the very first *Setting* of the *Mouth* of the *Glasse*, vpon the *Bottome* of the *Basen*, it draweth vp the *Water* a little, and then standeth at a Stay, almost till the *Candles Going out*, as was said. This may shew some *Attraction* at first: But of this we will speake more, when we handle *Attractions* by *Heat*.

Experiments in Consort, touching the *Influences* of the *Moone*.

Of the *Power* of the *Celestiall Bodies*, and what more Secret *Influences* they haue, besides the two Manifest *Influences* of *Heat*, and *Light*, We shall speake, when we handle *Experiments* touching the *Celestiall Bodies*: Meane-while, wee will giue some Directions for more certaine *Trials*, of the *Vertue* and *Influences* of the *Moone*; which is our *Nearest Neighbour*.

The *Influences* of the *Moone*, (most obserued,) are Foure. The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: The *Increase* of *Moisture*: The *Exciting* of the *Motions* of *Spirits*.

For

For the *Drawing forth* of *Heat*, we haue formerly prescribed, to take *Water Warme*, and to set Part of it against the *Moone-Beames*, and Part of it with a *Skreene* betweene; And to see whether that which standeth Exposed to the *Beames*, will not *Coole* sooner. But because this is but a Small *Interposition*, (though in the *Sunne* wee see a Small *Shade* doth much,) it were good to try it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warme* in a *Glasse-Bottle*, aswell as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c. 890

For the *Inducing* of *Putrefaction*, it were good to try it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth not, for the like time; To see whether will corrupt sooner: And try it also with *Capon*, or some other *Fowle*, laid abroad, to see whether it will mortifie, and become tender sooner? Try it also with Dead *Flies*, or Dead *Wormes*, hauing a little *Water* cast vpon them, to see whether will *Putrifie* sooner. Try it also with an *Apple*, or *Orenge*, hauing *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Try it also with *Holland-Cheese*, hauing *Wine* put into it, whether will breed *Mites* sooner, or greater? 891

For the *Increase* of *Moisture*, the Opinion Receiued is; That *Seeds* will grow sooneſt; And *Haire*, and *Nailes*, and *Hedges*, and *Herbs*, Cut, &c, will grow sooneſt, if they be Set, or Cut, in the *Increase* of the *Moone*. Also that *Braines* in *Rabits*, *Wood-cocks*, *Calues*, &c. are fullest in the *Full* of the *Moone*: And so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you haue them in *Pits*. 892

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) and set some of them immediately after the *Change*; And others of the same kinde immediately after the *Full*: Let them be as Like as can be: The *Earth* also the Same as neare as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* 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 *Moone*, come to a certaine Height; And how they differ from those that are *Set* in the *Decrease* of the *Moone*. 893

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, vpon the *Full* of the *Moone*: And therefore it were good for those that haue *Moist Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloës*, *Rose-Mary*, *Frankincense*, &c. about the full of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the *Full*; For that then the *Humours* will not replenish so soone againe. 894

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbes*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*. 895

There may be other Secret *Effects* of the *Influence* of the *Moone*, which are not yet brought into *Obseruation*. It may be, that if it so fall 896

out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be obserued.

897 It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, & larger, than those that are brought forth in the *Wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandry*, to put *Rams*, and *Bulls* to their *Females*, somewhat before the *Full* of the *Moone*. It may be also, that the *Egs* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Obseruation*: *Quare* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*?

Experiment Solitary touching *Vinegar*.

898 The *Turning* of *Wine* to *Vinegar*, is a Kinde of *Putrefaction*: And in *Making* of *Vinegar*, they vse to set *Vessels* of *Wine* ouer against the *Noone-Sunne*; which calleth out the more *Oyly Spirits*, and leaueth the *Liquour* more *Soure*, and *Hard*. We see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said, that *Cider* in *Nauigations* vnder the *Line* ripeneth, when *Wine* or *Beere* soureth. It were good to set a *Rundlet* of *Veriuyce* ouer against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will Ripen, and Sweeten.

Experiment Solitary, touching *Creatures* that *sleepe* all *Winter*.

899 There be diuers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hog*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *Want* of *Assimilating*; For whatsoeuer *Assimilateth* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, haue been obserued not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remoue*. And they get *Warme* and *Close Places* to *Sleepe* in. When the *Flemmings* Wintred in *Noua Zembla*, the *Beares*, about the Middle of *Nouember*, went to *Sleepe*; And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Beare* breedeth, and lyeth in with her Young, during that time of *Rest*: And that a *Beare*, *Big* with *Young*, hath seldome beene seene.

Experiment Solitary touching the *Generating* of *Creatures* by *Copulation*, and by *Putrefaction*.

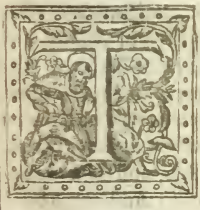
900 Some *Liuing Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (neuertheleſſe) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Viuification*, is a *Gentle* and *Proportionable Heat*, working vpon a *Glutinous* and *Teelding 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 *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Teelding*, is driuen forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*. There-

Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, haue euermore a *Closeneſſe*, *Lentour*, and *Sequacity*. It ſeemeth therefore, that the *Generation* by *Sperme onely*, and by *Putrefaction*, haue two Different *Cauſes*. The First is, for that *Creatures*, which haue a *Definite* and *Exact Shape*, (as thoſe haue which are Procreated by *Copulation*,) cannot be produced by a *Weake*, and *Caſuall 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 *Viuification* be of any length, then the *Spirit* will Exhale, before the *Creature* be *Mature*: Except it be Encloſed in a *Place* where it may haue *Continuance* of the *Heat*, *Acceſſe* of ſome *Nouriſhment* to maintaine it, and *Closeneſſe* that may keepe it from *Exhaling*. And ſuch *Places* are the *Wombes*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Vncertaine Shape*; And are made in *Shorter Time*; And need not ſo Perfect an *Encloſure*, though ſome *Closeneſſe* be commonly required. As for the *Heathen Opinion*, which was, that vpon great *Mutations* of the *World*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and ſuch like, are now; Wee know it to be vaine: But if any ſuch Thing ſhould be admitted, Diſcourſing according to *Senſe*, it cannot be, except you admit a *Chaos* first, & *Commixture* of *Heauen*, and *Earth*. For the *Frame* of the *World*, once in Order, cannot effect it by any *Exceſſe*, or *Caſualtie*.

NATV-

NATVRALL HISTORIE.

X. Century.



THe *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first plant a *Monstrous Imagination*, Which afterwards was, by the *Schoole* of *Plato*, and Others, Watred, and Nourished. It was, that the *World* was *One, Entire, Perfect, Liuing Creature*; Insomuch as *Apollonius of Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing* and *Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Liuing Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deitie* besides;) But only

Experiments in Consort touching the *Transmission*, and *Influx*, of *Immateriate Vertues*, and the *Force* of *Imagination*.

only the *Soule*, or *Essentiall Forme* of the *Vniuerse*. This *Foundation* being laid, they mought build vpon it, what they would; For in a *Liuing Creature*, though neuer so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one *Part* of the *Body*, instantly make a *Transcursion* thorowout the whole *Body*: So that by this they did insinuate, that no *Distance* of *Place*, not *Want* or *Indisposition* of *Matter*, could hinder *Magicall Operations*; But that, (for Example,) wee mought here in *Europe*, haue *Sense* and *Feeling* of that, which was done in *China*: And likewise, we mought worke any *Effect*, *without*, and *against Matter*: And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but only by the *Vnitie* and *Harmonie* 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 *Microcosme*,) doe giue a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelsus*, and some darksome *Authors* of *Magicke*, doe ascribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With these Vast and Bottomelesse *Follies*, *Men* haue been (in part) entertained.

But wee, that hold firme to the *Works* of *God*; And to the *Sense*, which is *Gods Lampe*; (*Lucerna Dei Spiraculum Hominis*;) will enquire, with all Sobrietie, and Seueritie, whether there be to be found, in the Foot-steps of *Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either vpon the *Body Imaginant*, or vpon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in Purging the *Stable* of *Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Obseruations*, any thing that is cleane, and pure *Naturall*; And not to be either Contemned, or Condemned. And although wee shall haue occasion to speake of this in more Places than One, yet we will now make some Entrance thereinto.

Experiments in Consort, *Monitory*, touching *Transmission of Spirits*, and the *Force* of *Imagination*.

Men are to be Admonished, that they doe not with-draw Credit, from the *Operations* by *Transmission* of *Spirits*, and *Force* of *Imagination*, because the *Effects faile sometimes*. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is most certaine, that the

the *Infection* is receiued (many times) by the *Body Passiue*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it be formed into a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Ouercome, by the *Minde* and *Spirit*, which is *Passiue*, before it worke any manifest *Effect*. And therefore, they worke most vpon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearfull Persons*; *Children*, and *Young Creatures*;

Nescis quis teneros Oculus mihi fascinat Agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. As for the *Weaknesse* of the *Power* of them, vpon *Kings*, and *Magistrates*; It may be ascribed, (besides the maine, which is the *Protection* of *God*, ouer 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 Beleefe, that they can hurt such *Persons*.

Men are to be Admonished, on the other side, that they doe not easily giue Place and Credit to these *Operations*, because they *Succeed many times*; For the *Cause* of this *Successe*, is (oft) to be truly ascribed, vnto the *Force* of *Affection* and *Imagination*, vpon the *Body Agent*; And then by a *Secondary Meanes*, it may worke vpon a *Diuers Body*: As for Example; If a *Man* carry a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeuing strongly, that it will helpe him to obtaine his *Loue*; Or to keepe him from danger of hurt in *Fight*; Or to preuaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industrie*, and *Perseuerance*, (especially in *Ciuill Business*,) who knoweth not? For wee see *Audacitie* doth almost binde and mate the *weaker Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to trie Things oft, and neuer to giue ouer, doth Wonders: Therefore, it were a Meere *Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, vpon another *Body*, which is but the *Force* of *Imagination* vpon the Proper *Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly vpon the *Body* of the *Imaginant*: As wee shall shew in due place. 902

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 *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as diuers wise *Iudges* haue prescribed, and cautioned, *Men* may not too rashly beleeue, the *Confessions* of *Witches*, nor yet the *Euidence* against them. For the *Witches* themselues are *Imaginatiue*, and beleeue oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the Obseruing, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witches*, and the Meetings of *Witches* that haue beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselues into 903

other *Bodies*; &c. are still reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Annointing* themselues all ouer. This may iustly moue a *Man* to thinke, that these *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, shut in the *Vapours*, and send them to the *Head* extremely. And for the Particular *Ingredients* of those *Magicall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*, we know is vsed for Procuring *Dead Sleepes*: And if any *Man* say, that this *Effect* would be better done by Inward *Potions*; Answer may be made, that the *Medicines*, which goe to the *Ointments*, are so strong, that if they were vsed inwards, they would kill those that vse them: And therefore they worke Potently, though Outwards.

We will diuide the Seuerall Kindes of the *Operations*, by *Transmission* of *Spirits*, and *Imagination*; Which will giue no small Light to the *Experiments* that follow. All *Operations* by *Transmission* of *Spirits*, and *Imagination* haue this; That they *Worke* at *Distance*, and not at *Touch*; And they are these being distinguished.

904 The First is the *Transmission* or *Emission*, of the *Thinner*, and more *Airy Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the rest, the most *Corporeall*. But you must remember withall, that there be a Number of those *Emissions*, both *Wholesome*, and *Vnwholesome*, that giue no *Smell* at all: For the *Plague*, many times, when it is taken, giueth no *Sent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other Proofes, that differ not in *Smell* from other *Aires*. And vnder this Head, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some neuertheless are strange, and very suddenly diffused; As the *Alteration*, which the *Aire* receiueth in *Ægypt*, almost immediately, vpon the *Rising* of the *Riuer* of *Nilus*, whereof we haue spoken.

905 The Second is the *Transmission* or *Emission* of those *Things* that wee call *Spirituall Species*; As *Visibles*, and *Sounds*: The one whereof wee haue handled; And the other we shall handle in due place. These moue swiftly, and at great distance; But then they require a *Medium* well disposed; And their *Transmission* is easily stopped.

906 The Third is the *Emissions*, which cause *Attraction* of *Certaine Bodies* at *Distance*; Wherein though the *Loadstone* be commonly placed in the First Ranke, yet we thinke good to except it, and referre it to another *Head*: But the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Siluer*, 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 diuers others; We shall handle, but yet not vnder this present *Title*, but vnder the *Title* of *Attraction* in generall.

The

The Fourth is the *Emission* of *Spirits*, and *Immateriate Powers* and *Vertues*, in those Things, which worke by the *Vniuersall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influxes*, (as is vainly taught and receiued,) but by the *Primitiue Nature* of *Matter*, and the *Seeds* of *Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this Kinde is the *Motion* of *Grauity*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kinde we conceiue the *Maine Float* and *Re-float* of the *Sea* is, which is by *Consent* of the *Vniuerse*, as Part of the *Diurnall Motion*. These *Immateriate Vertues* haue this Property differing from Others; That the *Diuersity* of the *Medium* hindreth them not; But they passe through all *Mediums*, yet at *Determinate distances*. And of these we shall speake, as they are incident to seuerall *Titles*. 907

The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, vpon 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 *Enuious*, or *Amorous Aspect*, doth infect the *Spirits* of Another, there is Ioyned both *Affection*, and *Imagination*. 908

The Sixth is, the Influxes of the *Heauenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*. 909

The Seuenth is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* haue brought into an *Art*, or *Precept*: And it is this; That if you desire to Super-induce, any *Vertue* or *Disposition*, vpon a *Person*, you should take the *Liuing Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you must take those *Parts*, in the *Time*, and *Act*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cocke* haue beene in *Fight*; And let them be worne, vpon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake vnder this present *Title*. 910

The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly auouched by many: And wee haue set it downe, as a Law to our Selues, to examine things to the Bottome; And not to receiue vpon Credit, or reiect vpon Improbabilities, vntill there hath passed a due Examination. This is, the *Sympathy* of *Indiuiduals*: For as there 911

there is a *Sympathy* of *Species*; So,(it may be) there is a *Sympathy* of *Indiuiduals*: That is, that in *Things*, or the *Parts* of *Things*, that haue beene once *Contiguous*, or *Entire*, there should remaine a *Transmission* of *Vertue*, from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Teli*: And so of a *Peece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke vpon the other *Part Seuered*. Now wee will pursue the *Instances* themselues.

Experiments in Consort, touching *Emission* of *Spirits* in *Vapoty*, or *Exhalation*, *Odour-like*.

The *Plague* is many times taken without *Manifest Sense*, as hath beene 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 receiued, that *Smels* of *Flowers*, that are *Mellow* and *Lusbious*, are ill for the *Plague*; As *White Lillies*, *Cowslips*, and *Hyacinths*.

912 The *Plague* is not easily receiued by such, as continually are about them, that haue the *Plague*; As *Keepers* of the *Sicke*, and *Physitians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe* and *Seed*; &c.) Or Outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and such as are of a *Dry* and *Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Blood*, more than to a *Stranger*.

913

914 The most Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*; When *Prisoners* haue beene Long, and Close, and Nastily kept; Whereof we haue had, in our time, Experience, twice or thrice; when both the *Iudges* that sate vpon the *Iayle*, and Numbers of those that attended the Busiaesse, or were present, *Sickned* vpon it, and *Died*. Therfore it were good wisdome, that in such Cases, the *Iayle* were Aired, before they be brought forth.

915 Out of question, if such *Foule Smels* be made by *Art*, and by the Hand, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinckes*, which the *Nosthrils* streight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as haue some Similitude with *Mans Body*; And so insinuate themselues, and betray the *Spirits*. There may be great danger, in vsing such Compositions, in great Meetings of People, within Houses; As in *Churches*; At *Arraigunments*; At *Playes* and *Solemnities*; And the like; For *Poysoning* of *Aire* is no lesse dangerous than *Poysoning* of *Water*; Which hath beene vsed by the *Turkes* in the Warres; And was vsed by *Emanuel Commenus* towards the *Christians*, when they passed thorow his *Countrey* to the *Holy Land*. And these *Empoisonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of the *Infection*: And therefore, where any such Thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

916 The *Empoysonment* of Particular *Persons*, by *Odours*, hath beene reported

portee to be in *Perfumed Gloues*, or the like: And it is like, they Mingle the *Poison* that is deadly, with some *Smels* that are Sweet, which also maketh it the sooner receiued. *Plagues* also haue been raised by *Annoinings* of the *Chinckes* of *Doores*, and the like; Not so much by the Touch, for that it is common for *Men*, when they finde any thing Wet vpon 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 Aires*, cannot be made without *Danger* of *Death*, to them that make them. But then againe, they may haue some *Antidotes* to saue themselues; So that *Men* ought not to be secure of it.

There haue beene, in diuers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they haue beene dead, and cast vpon Heaps. 917

It hapneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other Workes about *Metals*, and *Minerals*, haue their *Braines* Hurt and Stupefied by the *Metalline Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Siluer*, euer fly to the *Skull*, *Teeth*, or *Bones*; In so much as *Gilders* vse to haue a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Siluer*; Which *Gold* afterwards they finde to be Whitened. There are also certaine *Lakes*, and *Pits*, such as that of *Auernus*, that *Poyson Birds*, (as is said,) which fly ouer them; Or *Men*, that stay too long about them. 918

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a Close Roome, 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 a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Noua Zembla*, and that they could gather no more Stickes, they fell to make Fire of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a Generall Silence, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell downe in a Swoune; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saued themselues. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* be made in them; Whereof no lesse *Man* than the *Emperour Iouinianus* Died. 919

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, vpon the First *Showers*, after long *Drought*. 920

It hath come to passe, that some *Apothecaries*, vpon *Stamping* of *Coloquintida*, haue beene put into a great *Skouring*, by the *Vapour* onely. 921

It hath beene a Practise, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it prouoketh a *Continuall Sneezing*, in those that are in the *Roome*. 922

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And that a *Menstruous Woman*, looking vpon a *Glasse*, doth rust it. Nay they haue 923

haue an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going ouer a *Field*, or *Garden*, doe *Corne* and *Herbes* good by *Killing* the *Wormes*.

924 The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *Wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

925 *Perfumes* Conuenient doe dry and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dryed, and *Lignum Aloës*, and *Calamus*, taken at the *Mouth*, and *Nosthrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be vsed in *Burning Agues*, *Consumptions*, and too much *Wakefulnesse*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaues* of *Vines* sprinckled with a little *Rose-Water*, &c.

926 They doe vse in *Sudden Faintings*, and *Swounings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are vpon point to resolue, and fall away.

927 *Tobacco* comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh partly by Opening; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to try 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 Triall be made of the *Drying Fume*, of *Rose-Mary*, and *Lignum Aloës*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

928 The *Following* of the *Plough*, hath been approued, 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 *Aire* of the *Earth*, new turned vp, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselues much good by kneeling vpon a Cushion, and *Weeding*. And these Things you may practise in the best *Seasons*; Which is euer 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 liued Long, who had a Cleane *Clod* of *Earth*, brought to him euery *Morning*, as he sate in his *Bed*; And he would hold his *Head* ouer it, a good pretty while. I Commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Prouided alwaies, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

929 They haue, in *Physicke*, Vse of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Prouoking* of *Sleepe*, &c. For though those *Things* be not so Strong as *Perfumes*, yet you may haue them continually in your *Hand*; whereas *Perfumes* you can take but at

Times;

Times; And besides, there be diuers *Things*, that breath better of themselues, than when they come to the *Fire*; As *Nigella Romana*, the *Seed* of *Melanthium*, *Amomum*, &c.

There be two *Things*, which (inwardly vsed) doe Coole and condense the *Spirits*; And I wish the same to be tried outwardly in *Vapours*. The One is *Nitre*, which I would haue dissolued in *Malmesey*, or *Greeke-Wine*, and so the *Smell* of the *Wine* taken; Or if you would haue it more forcible, poure of it vpon a *Fire-pan*, well heated, as they doe *Rose-Water*, and *Vinegar*. The other is, the *Distilled Water* of *Wilde Poppy*; which I wish to be mingled, at halfe, with *Rose-Water*, and so taken with some *Mixture* of a few *Cloues*, in a *Perfuming-Pan*. The like would be done with the *Distilled Water* of *Saffron Flowers*. 930

Smells of *Muske*, and *Amber*, and *Ciuit*, are thought to further *Venereous Appetite*: Which they may doe by the *Refreshing* and *Calling forth* of the *Spirits*. 931

Incense, and *Nidorous Smells*, (such as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to dispose *Men* to *Deuotion*: Which they may doe, by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. Wee see, that amongst the *Iewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vses*. 932

There be some *Perfumes*, prescribed by the *Writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c. 933

It is certaine, that *Odours* doe, in a small Degree, Nourish; Especially the *Odour* of *Wine*: And we see *Men* a hungred, doe loue to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the House, complaine, that she should be kept from being at a *Feast*, and *Solemnity*, (which she much desired to see,) because there would be a *Corps* in the House; Whereupon he caused *Loaues* of *New Bread* to be sent for, and opened them; And powred a little *Wine* into them; And so kept himselfe aliue with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea fiue dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* vsed to haue continually, a great *Wispe* of *Herbes*, that he smelled on: And amongst those *Herbes*, some *Esculent Herbs* of strong *Sent*; As *Onions*, *Garlicke*, *Leekes*, and the like. 934

They doe vse, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by those *Ill Smells*, the *Rising* of the *Mother* is put downe. 935

There be *Aires*, which the *Physitians* aduise their *Patients* to remoue vnto, in *Consumptions*, or vpon *Recouery* of *Long Sicknesses*: Which (commonly) are *Plaine Champaignes*, but *Grasing*, and not Ouer-growne with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groues* of *Bayes* doe forbid *Pestilent Aires*; Which was accounted 936

accounted a great *Cause* of the Wholesome *Aire* of *Antiochia*. There be also some *Soyles* that put forth *Odorate Herbes* of themselues; As *Wilde Thyme*; *Wilde Maioram*; *Penny-Roiall*; *Camomill*; And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discouer an *Excellent Aire*.

937 It were good for *Men*, to thinke of hauing *Healthfull Aire*, in their *Houses*; Which will neuer be, if the *Roomes* be *Low-roofed*, or full of *Windowes*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it Exceeding *Vnequall*; Which is a great Enemy to *Health*. The *Windowes* also should not be high vp to the *Roofe*, (which is in vse for Beauty, and Magnificence,) but Low. Also *Stone-Walls* are not wholesome; But *Timber* is more wholesome; And especially *Brick*. Nay it hath beene vsed by some, with great Successe, to make their *Walls* thicke; And to put a Lay of *Chalke* betweene the *Brickes*, to take away all *Dampishnesse*.

Experiment Solitary touching the *Emissions* of *Spiritual Species* which *Affect* the *Senses*.

938 These *Emissions*, (as we said before,) are handled, and ought to be handled, by themselues, vnder their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to giue some generall *Obseruations*, Common to both. First, they seeme to be *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effective* of any *Thing*; Nor leaue no *Worke* behinde them; But are *Energies* meerely; For their *Working* vpon *Mirrours*, and *Places* of *Eccho*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windowes*, or *Rarefying* the *Aire* by *Great Noyses*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake a Nature*, as they affect onely such a Rare, and Attenuate *Substance*, as is the *Spirit* of *Liuing Creatures*.

Experiments in Consort, touching the *Emission* of *Immaticriate Vertues* from the *Mindes*, and *Spirits* of *Men*, either by *Affections*, or by *Imaginations*, or by other *Impressions*.

939 It is mentioned in some *Stories*, that where *Children* haue been *Exposed*, or taken away young from their *Parents*; And that afterwards they haue approached to their *Parents* presence, the *Parents*, (though they haue not knowne them,) haue had a *Secret Ioy*, or Other *Alteration* thereupon.

940 There was an *Ægyptian South-Sayer*, that made *Anthonius* beleeue, that his *Genius*, (which otherwise was *Braue*, and *Confident*,) was, in the Presence of *Octauianus Cæsar*, *Poore*, and *Cowardly*: And therefore, he aduised him, to absent himselfe, (as much as he could,) and remoue far from him. This *South-Sayer* was thought to be suborned by *Cleopatra*, to make him liue in *Ægypt*, and other Remote *Places* from *Rome*. Howsoeuer the Conceit of a *Predominant* or *Mastering Spirit*, of one *Man* ouer Another, is Ancient, and Receiued still, euen in *Vulgar Opinion*.

There

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 *Iouiall Nature*, doe dispose the *Company to be Merry* and *Cheerefull*. And againe, that some *Men* are *Lucky* to be *kept Company* with, and *Employed*; And Others *Vnlucky*. 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*. 941

It hath beene obserued, that *Old Men*, who haue loued *Young Company*, and beene Conuersant continually with them, haue beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which euer had *Young Auditours*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who liued till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilius*, &c. 942

Audacity and *Confidence* doth, in Ciuill Businesse, so great Effects, as a *Man* may (reasonably) doubt, that besides the very *Daring*, and *Earnestnesse*, and *Persisting* and *Importunity*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*. 943

The *Affections* (no doubt) doe make the *Spirits* more *Powerfull*, and *Actiue*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Loue*, and *Enuy*, which is called *Oculus Malus*. As for *Loue*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Louer*, doth passe into the *Spirits*, of the *Person Loued*; Which causeth the desire of Returne into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contact*, and *Coniunction*, which is in *Louers*. And this is obserued likewise, that the *Aspects* that procure *Lone*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Enuy*, that emitteth some *Malione* and *Poysonous Spirit*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an *Enuious Eye* is cast vpon *Persons* in *Glory*, and *Triumph*, and *Ioy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Enuious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* haue beene ill disposed, for some Daies following. We see the Opinion of *Fascination* is Ancient, for both *Effects*; Of Procuring *Loue*; And *Sicknesse* caused by *Enuy*: And *Fascination* is euer 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*. 944

Feare, and *Shame*, are likewise *Infectiue*; 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 behalfe. 945

Now we will ſpeake of the *Force* of *Imagination* vpon other *Bodies*; And of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I vnderſtand to be, the *Repreſentation* of an *Indiuiduall Thought*. *Imagination* is of three Kinds: The Firſt *Ioyned* with *Beleefe* of that which is to *Come*: The Second *Ioyned* with *Memory* of that which is *Paſt*: And the Third is of *Things Preſent*, or as if they were *Preſent*; For I comprehend in this, *Imaginations Faigned*, and at *Pleaſure*; As if one ſhould *Imagine* ſuch a *Man* to be in the *Veſtments* of a *Pope*; Or to haue *Wings*. I ſingle out, for this time, that which is with *Faith*, or *Beleefe* of that which is to *Come*. The *Inquiſition* of this *Subiect*, 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 be made, but with Extreme Caution, for the Reaſon which wee will hereafter declare.

The *Power* of *Imagination* is in three Kindes; The Firſt, vpon the *Body* of the *Imaginant*; Including likewiſe the *Childe* in the *Mothers Wombe*; The Second is, the *Power* of it vpon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*, &c. The Third is, the *Power* of it, vpon the *Spirits* of *Men*, and *Liuing Creatures*: And with this laſt we will onely meddle.

The *Probleme* therefore is, whether a *Man Conſtantly* and *Strongly Beleeuing*, that ſuch a *Thing* ſhall be; (As that ſuch an *One* will *Loue Him*; Or that ſuch an *One* will *Grant him* his *Requeſt*; Or that ſuch an *One* ſhall *Recouer* a *Sicknaſſe*; Or the like;) It doth helpe any thing to the *Effecting* of the *Thing* it ſelfe. And here againe we muſt warily diſtinguiſh; For it is not meant, (as hath beene partly ſaid before,) that it ſhould helpe by *Making* a *Man* more *Stout*, or more *Induſtrious*; (In which kinde a *Conſtant Beleefe* doth much;) But meerely by a *Secret Operation*, 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 Selfe to *Beleeue* what I will, and ſo no *Triall* can be made. Nay it is worſe; For whatſoeuer a *Man Imagineth doubtingly*, or with *Feare*, muſt needs doe hurt, if *Imagination* haue any *Power* at all;

For

For a *Man* representeth that oftner, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleefe*, and not by *Himselfe*; Vntill *Himselfe* haue found by *Experience*, that *Imagination* doth preuaile; For then *Experience* worketh in *Himselfe Beleefe*; If the *Beleefe*, that such a *Thing* shall be, be ioyned with a *Beleefe*, that his *Imagination* may procure it.

For Example; I related one time to a *Man*, that was Curious, and Vaine enough in these Things; *That I saw a Kinde of* Iugler, *that had a* Paire *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 *vpon him, and* Binding *his* Imagination *by a* Stronger, *that he could* Thinke no other *Card*. And thereupon he asked me a *Question*, or two, which I thought he did but cunningly, knowing before what vsed to be the *Feats* of the *Iugler*. *Sir, (said hee,) doe you remember whether he told the* Card, *the* Man *thought*, Himselfe, *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) Himselfe could not haue put on so strong an* Imagination; *But by telling the other the* Card, *(who beleeued that the* Iugler *was some Strange* Man, *and could doe Strange* Things,) *that other* Man *caught a strong* Imagination. I harkened vnto him, thinking for a Vanity he spoke prettily. Then he asked me another *Question*: Saith he; *Doe you remember, whether he bad the* Man *thinke the* Card *first, and afterwards told the other* Man *in his Eare, what he should thinke, Or else that he did whisper first in the* Mans *Eare, that should tell the* Card, *telling that such a* Man *should thinke such a* Card, *and after bade the* Man *thinke a* Card? I told him, as was true; *That he did first whisper the* Man *in the Eare, that such a* Man *should thinke such a* Card: Vpon this the *Learned Man* did much Exult, and Please himselfe, saying; *Loe, you may see that my* Opinion *is right: For if the* Man *had thought first, his* Thought *had beene Fixed; But the other* Imagining *first, bound his* Thought. Which though it did somewhat sinke with mee, yet I made it Lighter than I thought, and said; *I thought it was* Confederacy, *betweene the* Iugler, *and the two* Seruants: Though (Indeed) I had no Reason so to thinke: For they were both my *Fathers* Seruants; And he had neuer plaid in the House before. The *Iugler* also did cause a *Garter* to be held vp; And tooke vpon him, to know, that such a *One*, should point in such a *Place*, of the *Garter*; As it should be neare 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 *Actour Thinke*. 946

Hauing told this *Relation*, not for the Weight thereof, but

becauſe it doth handſomely open the *Nature* of the *Queſtion*; I returne to that I ſaid; That *Experiments* of *Imagination*, muſt be practiſed by Others, and not by a *Mans* Selfe. For there be Three *Meanes* to fortifie *Beleefe*: 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 *Beleefe* vpon *Reaſon*, or *Experience*, will Stagger.

947 For *Authoritie*, it is of two Kindes; *Beleefe* in an *Art*; And *Beleefe* in a *Man*. And for Things of *Beleefe* in an *Art*; A *Man* may exerciſe them by *Himſelfe*; But for *Beleefe* in a *Man*, it muſt be by *Another*. Therfore, if a *Man* beleeue in *Aſtrologie*, and finde a *Figure* Proſperous; Or beleeue in *Naturall Magicke*, and that a *Ring* with ſuch a *Stone*, or ſuch a *Peece* of a *Liuing Creature*, Carried, will doe good; It may helpe his *Imagination*: But the *Beleefe* in a *Man* is farre the more *Actiue*. But howſoeuer, all *Authoritie* muſt be out of a *Mans Selfe*, turned (as was ſaid,) either vpon an *Art*, or vpon a *Man*: And where *Authoritie* 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 *Beleefes*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reaſon*, or *Experience*: And vpon the ſame Reaſon, in *Magicke*, they vſe (for the moſt part,) *Boyes*, and *Young People*; whoſe *Spirits* eaſilieſt take *Beleefe*, and *Imagination*.

Now to fortifie *Imagination*, there be three Wayes: The *Authoritie* whence the *Beleefe* is deriued; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refreſh* it.

948 For the *Authoritie*, wee haue already ſpoken: As for the Second; Namely the *Meanes* to *Quicken*, and *Corroborate* the *Imagination*; Wee ſee what hath beene vſed in *Magicke*; (If there be in thoſe Practiſes any thing that is purely *Naturall*;) As *Veſtments*; *Characters*; *Words*; *Seales*; Some *Parts* of *Plants*, or *Liuing Creatures*; *Stones*; *Choice* of the *Houre*; *Geſtures* and *Motions*; Alſo *Incenſes*, and *Odours*; *Choice* of *Societie*, which increaſeth *Imagination*; *Diets* and *Preparations* for ſome time before. And for *Words*, there haue beene euer vſed, either *Barbarous Words*, of no Senſe, leſt they ſhould diſturbe the *Imagination*; Or *Words* of *Similitude*, that may ſecond and ſeed the *Imagination*: And this was euer as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are vſed alſo *Scripture Words*; For that the *Beleefe*, that *Religious Texts*, and *Words*, haue Power, may ſtrengthen the *Imagination*. And for the ſame Reaſon, *Hebrew Words*, (which amongſt vs is counted the *Holy Tongue*, and the *Words* more *Myſticall*,) are often vſed.

949 For the *Refreſhing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) Wee ſee the Practiſes of *Magicke*, as in *Images* of *Wax*, and

and the like, that should Melt by little, and little ; Or some other *Things Buried* in *Mucke*, that should Putrifie by little and little ; Or the like: For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Immateriate* a *Vertue*, as to worke at great *Distances*; Or through all *Mediums*; Or vpon all *Bodies*: But that the *Distance* must be Competent; The *Medium* not Aduerse ; And the *Body* Apt and Proportionate. Therefore if there be any Operation vpon *Bodies*, in Absence, by Nature ; it is like to be conueyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, should hurt any afarre off, it cannot be naturally, but by Working vpon the *Spirit* of some, that commeth to the *Witch*; And from that *Party* vpon the *Imagination* of *Another* ; And so vpon *Another* ; till it come to one that hath resort to the *Party Intended* ; And so by *Him* to the *Party intended himselfe*. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Party*, or the like ; yet there is lesse Credit to be giuen to those Things, except it be by *Working* of euill *Spirits*. 950

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, vpon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare Proofes ; For that they may be, by a Tacite *Operation* of *Maligne Spirits*: We shall therefore be forced, in this *Enquirie*, to resort to New *Experiments*: Wherein wee can giue only *Directions* of *Trialls*, and not any *Positiue Experiments*. And if any *Man* thinke, that wee ought to haue staied, till wee had made *Experiment*, of some of them, our selues, (as wee doe commonly in other *Titles*,) the Truth is, that these *Effects* of *Imagination* vpon other *Bodies*, haue so little Credit with vs, as we shall trie them at leisure: But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessary, that He, by whom you worke, haue 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 worke but a weake *Impression*, in his *Imagination*. 951

It were good, because you cannot discerne fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did vse the *Imagination* of more than *One* ; That so you may light vpon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Seruants*, that their *Master* shall surely recouer. 952

The *Imagination* of *One*, that you shall vse, (such is the Variety of *Mens Mindes*,) cannot be alwaies alike *Constant*, and *Strong*; And if the Successe 953

Succesſe follow not ſpeedily, it will faint and leeſe *Strength*. To remedy this, you muſt pretend to Him, whoſe *Imagination* you vſe, ſeuerall *Degrees* of *Meanes*, by which to *Operate*; As to preſcribe him, that euery three Dayes, if he finde not the Succeſſe Apparent, he doe vſe another *Root*, or *Part* of a *Beaſt*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seuen Times. Alſo you muſt preſcribe a good Large Time for the *Effect* you promiſe; As if you ſhould tell a *Seruant* of a *Sick-Man*, that his *Maſter* ſhall recouer, but it will be Fourteene daies, eare he findeth it apparently, &c. All this to entertaine the *Imagination*, that it wauer leſſe.

954 It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenſes* and *Perfumes* taken at the *Noſthrills*; And *Ointments* of ſome *Parts*; doe (naturally) worke vpon the *Imagination* of Him that taketh them. And therefore it muſt needs greatly *Cooperate* with the *Imagination* of him, whom you vſe, if you preſcribe him, before he doe vſe the *Receit*, for the *Worke* which he deſireth, that he doe take ſuch a *Pill*, or a *Spoonefull* of *Liquour*; Or burne ſuch an *Incenſe*; Or *Annoint* his *Temples*, or the *Soles* of his *Feet*, with ſuch an *Ointment*, or *Oyle*: And you muſt chuſe, for the *Compoſition* of ſuch *Pill*, *Perfume*, or *Ointment*, ſuch *Ingredients*, as doe make the *Spirits*, a little more *Groſſe*, or *Muddy*: Whereby the *Imagination* will fix the better.

955 The *Body Paſſiue*, and to be *Wrought Vpon*, (I meane not of the *Imaginant*,) is better wrought vpon, (as hath beene partly touched,) at ſome *Times*, than at others: As if you ſhould preſcribe a *Seruant*, about a *Sick Perſon*, (whom you haue poſſeſſed, that his *Maſter* ſhall recouer,) when his *Maſter* is faſt aſleepe, to vſe ſuch a *Root*, or ſuch a *Root*. For *Imagination* is like to worke better vpon *Sleeping Men*, than *Men Awake*, As wee ſhall ſhew when we handle *Dreames*.

956 We finde in the *Art* of *Memory*, that *Images Viſible*, worke 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 vpon *Ariſtotles Phyſickes*; Than if you ſhould Imagine him to ſay; *Ile goe ſtudy Philoſophy*. And therefore, this *Obſeruation* would be tranſlated to the *Subiect* wee now ſpeake of: For the more Luſtrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceiue, that you ſhall, in that *Experiment*, (whereof wee ſpake before,) of *Binding* of *Thoughts*, leſſe faile, if you tell One, that ſuch an *One* ſhal name one of *Twenty Men*, than if it were *One* of *Twenty Cards*. The *Experiment* of *Binding* of *Thoughts*, would be Diuerſified, 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, vpon what *Things*, *Imagination* hath moſt Force: And the *Rule*, (as I conceiue,) is, that it hath moſt *Force* vpon *Things*, that haue the *Lighteſt*, and *Eaſieſt Motions*. And therefore aboue all, vpon the *Spirits* of *Men*: And in them, vpon ſuch *Affections*, as moue *Lighteſt*; As vpon *Procuring* of *Loue*; *Binding* of *Luſt*, which is

cuer

euer with *Imagination*; vpon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. Whatsoeuer is of this kinde would be throughly enquired. *Triall*s likewise would be made vpon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Dye this yeare; And will him, at these and these times, to goe vnto it, to see how it thriueth. As for *Inanimate Things*, it is true, that the *Mottons* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light Motions*; And there is a *Folly* very vsuall, that *Gamesters* imagine, that some that stand by them, bring them ill Lucke. 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* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such a *Name*, it shall goe off their *Fingars*: For these two are Extreme *Light Motions*. And howsoeuer I haue no *Opinion* of these things, yet so much I conceiue to be true; That *Strong Imagination* hath more Force vpon *Things Liuing*; Or that haue been *Liuing*, than *Things* meerely *Inanimate*: And more Force likewise vpon *Light*, and *Subtill Mottions*, than vpon *Mottions Vehement*, or *Ponderous*.

It is an vsuall *Obseruation*, that if the *Body* of One *Murthered*, be brought before the *Murtherer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, vpon the Presence of the *Murtherer*, hath opened the *Eyes*; And that there haue beene such like *Motions*, as well where the *Party Murthered* hath beene *Strangled*, or *Drowned*, as where they haue beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Iust Iudgement, who vsually bringeth *Murthers* to Light: But if it be *Naturall*, it must be referred to *Imagination*. 958

The *Tying* of the *Point* vpon the day of *Mariage*, to make *Men* Impotent towards their *Wiues*, which (as we haue formerly touched,) is so frequent in *Zant*, and *Gascony*, if it be *Naturall*, must be referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceiue it to haue the lesse Affinity with *Witchcraft*, because not Peculiar Persons onely, (such as *Witches* are,) but any *Body* may doe it. 959

There be many *Things*, that worke vpon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Pretious Stones*, worne, haue beene anciently and generally Receiued; And curiously assigned to worke seuerall *Effects*. So much is true; That *Stones* haue in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may worke by *Consent* vpon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be giuen 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 *Nouelty*. And this is one of the *Causes*, why *Pretious Stones* comfort. And therefore it were good to haue *Tincted Lanthornes*, or

Experiments in Consort, touching the *Secret Vertue* of *Sympathy*, and *Antipathy*. 960

or *Tincted Skreenes*, of *Glasse Coloured* into *Greene*, *Blew*, *Carnation*, *Crimson*, *Purple*, &c. And to vse them with *Candles* in the *Night*. So likewise to haue Round *Glasses*, not onely of *Glasse Coloured thorow*, but with *Colours* laid betweene *Crystals*, with *Handles* to hold in ones Hand. *Prismes* are also Comfortable Things. They haue of *Paris-Worke*, *Looking-Glasses*, bordered with broad *Borders* of small *Crystall*, and great Counterfeit *Pretious 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 Faire and Cleare *Pooles* doe greatly comfort the *Eyes*, and *Spirits*; Especially when the *Sunne* is not *Glaring*, but *Ouercast*; Or when the *Moone* shineth.

961 There be diuers 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 *Pearle*, or of *Corall*, as is vsed: And it hath beene noted that *Corall*, if the *Party* that weareth it be ill disposed, will wax *Pale*: Which I beleeue to be true, because otherwise *Distemper* of *Heat* will make *Corall* lose Colour. I Commend also *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with some *Cordiall Mixture*.

962 For *Corroboration* and *Confortation*, take such *Bodies* as are of *Astringent Quality*, without *Manifest Cold*. I commend *Bead-Amber*; which is full of *Astriction*, but yet is *Vnctuous*, and not *Cold*; And is conceiued to *Impinguate* those that weare such *Beads*: I commend also, *Beads* of *Harts-Horne*, and *Iuory*, which are of the like Nature; Also *Orenge-Beads*; Also *Beads* of *Lignum Aloes*, *Macerated* first in *Rose-Water*, and *Dryed*.

963 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*.

964 The Crampe, (no doubt,) commeth of *Contraction* of *Sinnewes*; Which is Manifest, in that it commeth either by *Cold*, or *Drinesse*; As after *Consumptions*, and *Long Agues*: For *Cold* and *Drinesse* doe (both of them) *Contract*, and *Corrugate*. We see also, that *Chafing* a little aboue the *Place* in paine, easeth the *Crampe*; Which is wrought by the *Dilatation*, of the *Contracted Sinnewes*, by *Heat*. There are in vse, for the Preuention of the *Crampe*, two Things; The one *Rings* of *Sea-Horse Teeth*, worne vpon the *Fingers*; The other *Bands* of *Greene Periwinckle*, (the Herbe,) tied about the *Calfe* of the *Leg*, or the *Thigh*, &c. where the *Crampe* vseth to come. I doe finde this the more strange, because Neither of these haue any *Relaxing Vertue*, but rather the Contrary. I iudge therefore, that their *Working*, is rather vpon the *Spirits*, within the *Nerues*, to make them striue lesse; Than vpon the *Bodily Substance* of the *Nerues*.

965 I would haue *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* 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 Effectuall Outwards; Where they may be applied in greater *Quantity*. There would be *Trochisch* likewise made

made of *Snakes*; Whose *Flesh dried*, is thought to haue a very *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would be made vp with *Amber-Grice*, and some *Pomander*.

It hath beene long receiued, and confirmed by diuers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth helpe the *Falling-Sicknesse*; And likewise the *Incubus*, which wee call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therfore the *Working* is, by *Extreme*, and *Subtill Attenuation*; Which that *Simple* hath. I iudge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c. 966

There is a *Stone*, which they call the *Blood-Stone*, which worne 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 *Toade* loueth *Shade*, and Coolenesse. 967

Light may be taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinckle*, how that those things, which asswage the *Strife* of the *Spirits*, doe helpe diseases, contrary to the *Intention* desired: For in the *Curing* of the *Crampe*, the *Intention* is to relax the *Sinnewes*; But the *Contraction* of the *Spirits*, that they striue lesse, is the best Helpe: So to procure easie *Trauailes* of *Women*, the Intention is to bring downe the *Childe*; But the best Helpe is, to stay the *Comming downe* too *Fast*: Whereunto they say, the *Toad Stone* likewise helpeth. So in *Pestilent Feauers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Euapouration*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and other *Coole Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe 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 *Vse*, that whatsoeuer appeaseth the *Contention* of the *Spirits*, further their *Action*. 968

The *Writers* of *Naturall Magick*, commend the Wearing of the *Spoile* of a *Snake*, for *Preserving* of *Health*. I doubt it is but a *Conceit*; For that the Snake is thought to renue her *Youth*, by Casting her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a Peece of a *Harts-Horne*, because those Renue. 969

It hath beene Anciently *Receiued*, (For *Pericles* the *Athenian* vsed it,) and it is yet in vse, to weare little *Bladders* of *Quick-Siluer*, or *Tablets* of *Arsenicke*, as *Preseruatiues* against the *Plague*: Not as they conceiue, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poysons* themselues, they draw the *Venome* to them, from the *Spirits*. 970

Vide the *Experiments* 95. 96. and 97. touching the *Seuerall Sympathies*, and *Antipathies*, for *Medicinall Vse*. 971

972 It is ſaid, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beaſt* of great *Edacity*, and *Diſgeſtion*; And ſo, it may be, the *Parts* of him comfort the *Bowels*.

973 We ſee *Scare-Crowes*, are ſet vp to keep *Birds* from *Corne*, and *Fruit*; It is reported by ſome, that the *Head* of a *Wolfe*, whole, dried, and hanged vp in a *Doue-Houſe*, will ſcare away *Vermine*; Such as are *Weaſils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For thoſe *Vermine* with vs, know *Dogs* better than *Wolues*.

974 The *Braines* of ſome *Creatures*, (when their *Heads* are roaſted) taken in *Wine*, are ſaid to ſtrengthen the *Memory*: As the *Braines* of *Hares*; *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it ſeemeth, to be incident to the *Braines* of thoſe *Creatures*, that are Fearefull.

975 The *Ointment*, that *Witches* vſe, is reported to be made, of the *Fat* of *Children*, digged out of their *Graues*; Of the *Iuyces* of *Smallage*, *Wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat* But I ſuppoſe that the *Soporiferous Medicines* are likeſt to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaues*, &c.

976 It is reported by ſome, that the *Affections* of *Beaſts*, when they are in Strength, doe adde ſome *Vertue*, vnto *Inanimate Things*; As that the *Skin* of a *Sheepe*, deuoured by a *Wolfe*, moueth *Itching*; That a *Stone*, bitten by a *Dog* in Anger, being throwne at him, drunke in *Powder*, prouoketh *Choler*.

977 It hath beene obſerued, that the *Diet* of *Women* with *Childe*, doth worke much vpon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to repreſſe and ſtay *Vapours*, that aſcend to the *Braine*,) it will make the *Childe* Ingenious: And on the contrary ſide, if the *Mother* eat (much) *Onions*, or *Beanes*, or ſuch *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Faſt* much; Or be giuen to much *Muſing*; (All which ſend, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the ſame Iudgement of *Tobacco*, often taken by the *Mother*.

978 The *Writers* of *Naturall Magicke* report, that the *Heart* of an *Ape*, worne neare 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*, applied to the *Necke*, or *Head*, helpeth the *Wit*; And is good for the *Falling-Sickneſſe*: The *Ape* alſo is a Witty *Beaſt*, and hath a *Dry Braine*; Which may be ſome *Cauſe* of *Attenuation* of *Vapours* in the *Head*. Yet it is ſaid to moue *Dreames* alſo. It may be, the *Heart* of a *Man* would doe more, but that it is more againſt *Mens* Mindes to vſe it; Except it be in ſuch as weare the *Reliques* of *Saints*.

979 The *Fleſh* of a *Hedge-Hog*, Dreſſed, & Eaten, is ſaid to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, muſt needs be *Harſh*, and *Dry*, becauſe it putteth forth ſo many *Prickles*: For *Plants* alſo, that are full of *Prickles*,

Prickles, are generally Dry: As *Briars*, *Thornes*, *Berberries*: And therefore the *Asbes* of a *Hedge-Hog* are said to be a great *Deficcatiue* of *Fistula's*.

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may also partake of a Secret *Propriety*; In that the *Bloud* draweth *Mans Flesh*. And it is approued, that the *Mosse*, which groweth vpon the *Skull* of a *Dead Man*, vnburied, will stanch *Bloud* potently. And so doe the *Dregs*, or *Powder* of *Bloud*, seuered from the *Water*, and *Dried*. 980

It hath beene practised, to make *White Swallowes*, by *Annointing* of the *Egs* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more Penurious. And it may be, the *Annointing* of the *Egs*, will be as Effectuall, as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93. 981

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 *Liuing Creature*,) haue 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*. 982

It hath beene anciently receiued, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the Body,) and erodeth them. Whereof the *Cause* is conceiued to be, a *Quality* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* haue vpon the *Watry Parts* of the *Body*; As *Vrine* and *Hydropicall Water*. And it is a good *Rule*, that whatsoeuer hath an *Operation* vpon certaine *Kindes* of *Matters*, that, in *Mans Body*, worketh most vpon those *Parts*, wherein that Kinde of *Matter* aboundeth. 983

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the same *Thing*, when it is *Aliue*, and when it is *Sound*; And with those *Parts* which doe *Excerne*: As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pockes*, *Scabs*, *Leprousie*, to *Sound Flesh*; And the *Excrement* of euery *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse Petnicious than the *Corruptions*. 984

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 *Dogges*; And that, though they haue neuer seene him before, yet they will all come forth, and barke, and fly at him. 985

The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so vncertaine, as they require a great deale of *Examination*, ere wee conclude vpon them. I would haue it first throughly inquired, whether there be any Secret Passages of *Sympathy*, betweene 986

Persons of *neare Bloud* ; As *Parents, Children, Brothers, Sisters, Nurse-Children, Husbands, Wives*, &c. There be many Reports in *Historie*, that vpon the *Death* of *Persons* of such Nearenesse, *Men* haue had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dreame*, which I told to diuers *English Gentlemen* ; That my *Fathers House*, in the *Countrey*, was *Plastered* all ouer with *Blacke Mortar*. There is an Opinion abroad, (whether Idle or no I cannot say,) That louing and kinde *Husbands*, haue a *Sense* of their *Wiues Breeding Childe*, by some *Accident* in their owne *Body*.

987 Next to those that are *Neare* in *Bloud*, there may be the like *Passage*, and *Instincts* of *Nature*, betweene great *Friends*, and *Enemies* : And sometimes the Reuealing is vnto Another *Person*, and not to the *Party* Himselfe. I remember *Philippus Commineus*, (a graue Writer,) reporteth ; That the *Arch-Bishop* of *Vienna*, (a *Reuerend Prelate*,) said (one day) after *Masse*, to *King Lewis* the eleuenth of *France* ; *Sir, your Mortall Enemie is dead* ; What time *Duke Charles* of *Burgundie* was Slaine, at the *Battell* of *Granson*, against the *Switzers*. Some triall also would be made, whether *Pact* or *Agreement* doe any thing ; As if two *Friends* should agree, that such a *Day* in euery *Weeke*, they 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 breake their *Vow* and *Promise*, the other should haue any *Feeling* of it, in *Absence*.

988 If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons* ; It is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes* : As if a *Victorie* 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 *Ioy*, or *Griefe*, that many *Men* are possest with, at once ? *Pius Quintus*, at the very time, when that Memorable *Victorie* was won, by the *Christians*, against the *Turks*, at the *Nauall Battell* of *Lepanto*, being then hearing of *Causes* in *Consistorie*, brake off suddenly, and said to those about him ; *It is now more time, we should giue thanks to God, for the great Victorie he hath granted vs, against the Turks*. It is true, that *Victorie* had a *Sympathie* with his *Spirit* ; For it was meerely his Worke, to conclude that *League*. It may be, that *Reuelation* was *Diuine* ; But what shall wee say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans* ? Where the *People*, being in *Theaters* at *Playes*, haue had Newes of *Victories*, and *Ouerthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition* : Namely, that *Men* obserue when *Things Hit*, and not when they *Misse* : And commit to Memory the one, And forget and passe ouer the other. But touching *Diuination*, and the *Misgiuing* of *Mindes*, wee shall

shall speake more, when wee handle in generall, the *Nature* of *Minds*, and *Soules*, and *Spirits*.

Wee haue giuen formerly some *Rules* of *Imgination*; And touching the *Fertifying* of the Same. Wee haue set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, vpon *Beasts*, *Birds*, &c. vpon *Plants*; And vpon *Inanimate Bodies*: Wherein you must still obserue, that your *Trialls* be vpon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*: And I leaue it to euery *Man*, to choose *Experiments*, which himselfe thinketh most Commodious; Giuing now but a few *Examples* of euery of the Three Kindes. 989

Vse some *Imaginant*, (obseruing the *Rules* formerly prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trie also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more Hardy, and the other more Cowardly. It would be tried also, in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hare*, with *Grey-hounds*; Or in *Horse-Races*; And the like *Comparatiue Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not run. 990

In *Plants* also, you may trie the *Force* of *Imagination*, vpon the *Lighter* Sort of *Motions*: As vpon the Sudden *Fading*, or Liuely *Comming vp* of *Herbs*; Or vpon their *Bending* one way, or other; Or vpon their *Closing*, and *Opening*; &c. 991

For *Inanimate Things*, you may trie the *Force* of *Imagination*, vpon Staying the *Working* of *Beere*, when the *Barme* is put in; Or vpon the *Comming* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* bee put in. 992

It is an Ancient *Tradition*, euery where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long Sticke, doth stupefie the *Hand* of him that toucheth it. It is one degree of *Working* at *Distance*, to worke by the Continuance of a Fit *Medium*; As *Sound* will be conueyed to the *Eare*, by striking vpon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*. 993

The *Writers* of *Naturall Magicke*, doe attribute much to the *Vertues*, that come from the *Parts* of *Liuing Creatures*; So as they be taken from them, the *Creatures* remaining still aliue: As if the *Creature* still liuing did infuse some *Immateriate Vertue*, and *Vigour*, into the *Part Seuered*. So much may be true; that any *Part*, taken from a *Liuing Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, *dying* of it *Selfe*, because it is fuller of *Spirit*. 994

Triall would be made, of the like *Parts* of *Indiuiduall*s, in *Plants*, and *Liuing Creatures*; As to cut off a *Stocke* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to see whether it will Decay the Rest of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*, or 995

or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

996 It is receiued, that it helpeth to *Continue Loue*, if one weare a *Ring*, or a *Bracelet*, of the *Haire* of the *Party Beloued*. But that may be by the *Exciting* of the *Imagination* : And perhaps a *Gloue*, or other like *Fauour*, may as well doe it.

997 The *Sympathie* of *Indiuiduals*, that haue beene *Entire*, or haue *Touched*, is of all others the most *Incredible* : Yet according vnto our faithfull Manner of *Examination* of *Nature*, wee will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waste, and consume, is a Common *Experiment* : And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* vpon one of my *Fingers* : Afterwards when I was about Sixteene Yeeres old, being then at *Paris*, there grew vpon both my *Hands* a Number of *Warts*, (at the least an hundred,) in a Moneths Space. The *English Embassadours Lady*, who was a *Woman* farre from *Superstition*, told me, one day ; She would helpe me away with my *Warts* : Whereupon she got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all ouer, with the *Fat Side* ; And amongst the rest that *Wart*, which I had had from my *Childhood* ; Then she nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, vpon a *Poast* of her *Chamber Window*, which was to the *South*. The Successe was, that within fiue weekes 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 maruell, because they came in a Short time, and might goe away in a Short Time againe : But the Going away of that, which had staid so long, doth yet sticke with mee. They say the like is done, by the *Rubbing* of *Warts* with a Greene *Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Mucke*. It would be tried, with *Corne*, and *Wenns*, and such other *Excrescences*. I would haue it also tried, with some *Parts* of *Liuing Creatures*, that are neareſt the *Nature* of *Excrescences* ; As the *Combes* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would haue it tried both wayes ; 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 Worke any Effect, towards the *Consumption* of that *Part*, which was once *Ioyned* with it.

998 It is constantly Receiued, and Auouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, vpon the Relation of *Men* of *Credit*, (though my selfe, as yet, am not fully inclined to beleeue it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of Diuers *Ingredients* ; whereof the Strangest and Hardest to come by, are the *Mosse* vpon the *Skull* of a *dead Man*, *Vnburied* ; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a Starting Hole ; That if the *Experiment* proued not, it mought be pretended, that the *Beasts* were not killed in the due Time ;

For

For as for the *Mosse*, it is certaine, there is great Quantitie of it in *Ireland*, vpon *Slaine Bodies*, laid on *Heaps*, *Vnburied*. The other *Ingredients* are, the *Bloud-Stone* in *Powder*, and some other *Things*, which seeme to haue a *Vertue* to *Stanch Bloud*; As also the *Mosse* hath. And the *Description* of the *whole Ointment* is to be found in the *Chymicall Dispensatorie* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but only applied to the *Weapon*. Thirdly, (which I like well) they doe not obserue the *Confecting* of the *Ointment*, vnder any certaine *Constellation*; which commonly is the Excuse of *Magicall Medicines*, when they faile, that they were not made vnder a fit *Figure* of *Heauen*. Fourthly, it may be applied 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 beene tried, that the *Ointment* (for *Experiments* sake,) hath beene wiped off the *Weapon*, without the knowledge of the *Party Hurt*, and presently the *Party Hurt*, hath beene in great *Rage* of *Paine*, 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*, whereby it bleedeth, the *Annointing* of that *Instrument* will serue, and worke the *Effect*. This I doubt should be a Deuice, to keepe this strange *Forme* of *Cure*, in Request, and Vse; Because many times you cannot come by the *Weapon* it selfe. Seuenthly, the *Wound* must be at first *Washed cleane*, with *White Wine*, or the *Parties* owne *Water*; And then bound vp close in *Fine Linnen*, and no more *Dressing* renewed, till it be *whole*. Eighthly, the *Sword* it selfe must be *Wrapped* vp *Close*, as fatre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you *wipe* it off from the *Sword*, and keepe it, will *Serue againe*; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *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 subiecteth the *Matter*, to an *Easie Triall*.

I would haue *Men* know, that though I reprehend, the *Easie Passing ouer*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not vnderstand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Indiuiduo*. So in *Physicke*, if you will cure the *Iaundies*, 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 goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receiue from *Experience*, that *Powder* of *Chamæpytis*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Physitian* doth not continue still

Experiment Solitary touching *Secret Proprieties*.

999

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 *Iaundies*, *Stone*, *Agues*, &c. that will doe good in one *Body*, which will not doe good in Another; According to the Correspondence the *Medicine* hath to the *Indiuiduall Body*.

Experiment Solitary, touching the *Generall Sympathy* of *Mens Spirits*.

1000 The *Delight* which *Men* haue in *Popularity*, *Fame*, *Honour*, *Submission*, and *Subiection* of other *Mens Mindes*, *Wills*, or *Affections*, (although these *Things* may be desired for other *Ends*,) seemeth to be a *Thing*, in it selfe, without Contemplation of Consequence, Gratefull & 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 *Diuine Limbus*; Else why should *Men* be so much affected with that, which others thinke, or say? The best Temper of *Mindes* desireth *Good Name*, and *True Honour*: The Lighter, *Popularity*, and *Applause*; The more depraued, *Subiection*, and *Tyranny*; As is seene in great *Conquerours*, and *Troublers* of the *World*: And yet more in *Arch-Heretickes*; for the Introducing of new *Doctrines*, is likewise an *Affectation* of *Tyranny*, ouer the *Vnderstandings*, and *Beleefes* of *Men*.

A

A TABLE OF the Experiments.

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Of

FINIS.

Faults escaped in the Printing.

PAge 6. line 28. latter, *reade* later. *p.* 18. *l.* 10. Quile, *r.* Quilts. *p.* 32. *l.* 37. Amalgama, *r.* Amalagma. *p.* 93. *l.* 35. lose, *r.* lost. *p.* 122. *l.* 3. Coppies, *r.* Coppice. *p.* 139. *on the Top of the Leafe, wanteth part of the Title*; Rudiments of Plants, and of the Excrescences of Plants, or Super-Plants. *p.* 222. *l.* 5. in *redundat.*

NEW ATLANTIS.

A VVorke vnfinished.

VVritten by the Right Honourable, FRANCIS *Lord Verulam, Viſcount* St. *Alban.*

NEW ATLANTIS.

WEE ſayled from *Peru*, (wher wee had continued by the ſpace of one whole yeare,) for *China* and *Iapan*, by the South Sea; taking with vs Victuals for twelue Moneths; And had good Windes from the Eaſt, though ſoft and weake, for fiue Moneths ſpace, and more. But then the Winde came about, and ſetled in the Weſt for many dayes, ſo as we could make little or no way, and were ſometimes in purpoſe to turne back. But then againe ther aroſe Strong and Great Windes from the South, with a Point Eaſt; which carried vs vp, (for all that we could doe) towards the North: By which time our Victualls failed vs, though we had made good ſpare of them. So that finding our ſelues, in the Midſt of the greateſt Wilderneſſe of Waters in the World, without Victuall, we gaue our Selues for loſt Men, and prepared for Death. Yet we did lift vp our Harts and Voices to GOD aboue, who *ſheweth his Wonders in the Deepe*; Beſeeching him of his Mercy, that as in the *Beginning* He diſcouered the *Face* of the *Deepe*, and brought forth *Dry-Land*; So he would now diſcouer Land to vs, that we mought not periſh. And it came to paſſe, that the next Day about Euening, we ſaw within a Kenning before vs, towards the North, as it were thick Cloudes, which did put vs in ſome hope of Land; Knowing how that part of the South Sea was vtterly vnknowne; And might haue Iſlands, or Continents, that hithertoo were not come to light.

 Where-

Wherefore we bent our Course thither, wher we saw the Appearance of Land, all that night; And in the Dawning of the next Day, we might plainly discerne that it was a Land; Flatt to our sight, and full of Boscage; which made it shew the more Darke. And after an Houre and a halfs Sayling, we entred into a good *Hauen*, being the Port of a faire *Citty*; Not great indeed, but well built, and that gaue a pleasant view from the Sea: And we thinking euery Minute long, till we were on Land, came close to the Shore, and offred to land. But straightwayes we saw diuers of the People, with Bastons in their Hands, (as it were) forbidding vs to land; Yet without any Cries or Fiercenesse, but onely as warning vs off, by Signes that they made. Wherevpon being not a little discomforted, we were aduising with our selues, what we should doe. During which time, ther made forth to vs a small Boate, with about eight Persons in it; wherof One of them had in his Hand a Tipstaffe of a yellow Cane, tipped at both ends with Blew, who came aboard our Shipp, without any shew of Distrust at all. And when he saw one of our Number, present himselfe somewhat afore the rest, he drew forth a little Scroule of Parchment, (somewhat yellower then our Parchment, and shining like the Leaues of Writing Tables, but otherwise soft and flexible,) and deliuered it to our foremost Man. In which Scroule were written in Ancient *Hebrew*, and in Ancient *Greeke*, and in good *Latine* of the Schoole, and in *Spanish*, these wordes; *Land yee not, none of you; And prouide to be gone, from this Coast, within sixteene daies, except you haue further time giuen you. Meanewhile, if you want Fresh Water, or Victuall, or helpe for your Sick, or that your Ship needeth repaire, write downe your wants, and you shall haue that, which belongeth to Mercy.* This Scroule was Signed with a Stampe of *Cherubins Wings*, not spred, but hanging downwards; And by them a *Crosse*. This being deliuered, the *Officer* returned, and left onely a Seruant with vs to receyue our Answeare. Consulting hereupon amongst our Selues, we were much perplexed. The Deniall of Landing, & Hasty Warning vs away, troubled vs much; On the other side

ſide, to finde that the People had Languages, and were ſo full of Humanity, did comfort vs not a little. And aboue all, the Signe of the *Croſſe* to that Inſtrument, was to vs a great Reioycing, and as it were a certaine Preſage of Good. Our Anſwer was in the *Spaniſh* tongue; *That for our Shipp, it was well; For we had rather mett with Calmes, and contrary winds, then any Tempeſts. For our Sick, they were many, and in very ill Caſe; So that if they were not permitted to Land, they ran danger of their Liues.* Our other Wants we ſett downe in particular, adding; *That we had ſome little ſtore of Merchandize, which if it pleaſed them to deale for, it might ſupply our Wants, without being chargeable vnto them.* We offred ſome Reward in Piſtoletts vnto the Seruant, and a peece of Crimſon Veluett to be preſented to the *Officer*: But the Seruant tooke them not, nor would ſcarce looke vpon them; And ſo left vs, and went back in another little Boate, which was ſent for him.

About three Houres after we had diſpatched our Anſwear, there came towards vs, a Perſon (as it ſeemed) of place. He had on him a Gowne with wide Sleeues, of a kinde of Water Chamolett, of an excellent Azure Colour, farre more gloſſy then ours: His vnder Apparell was Green; And ſo was his Hatt, being in the forme of a Turban, daintely made, and not ſo huge as the *Turkiſh* Turbans; And the Lockes of his Haire came downe below the Brimms of it. A Reuerend Man was he to behold. Hee came in a Boate, gilt in ſome part of it, with foure Perſons more onely in that Boate; And was followed by another Boate, wherein were ſome Twenty. When he was come within a Flight-ſhott of our Shipp, Signes were made to vs, that we ſhould ſend forth ſome to meet him vpon the Water; which we preſently did in our Shipp-Boate, ſending the principall Man amongſt vs ſaue one, and foure of our Number with him. When we were come within ſixe yards of their Boate, they called to vs to ſtay, and not to approach further; which we did. And therupon the Man, whom I before deſcribed, ſtood vp, and with a loud voice, in *Spaniſh*,

nish, asked; *Are yee Christians?* We answered; *We were*; fearing the lesse, because of the *Crosse* we had seen in the Subscription. At which Answear the said Person lift vp his Right Hand towards Heauen, and drew it softly to his Mouth, (which is the Gesture they vse, when they thank God;) And then said: *If yee will sweare, (all of you,) by the Meritts of the* Saviour, *that yee are no Pirates; Nor haue shed bloud, lawfully, nor vnlawfully, within fourtie daies past; you may haue License to come on Land.* Wee said; *Wee were all ready to take that Oath.* Wherupon one of those that were with him, being (as it seemed) a *Notary*, made an Entry of this Act. Which done, another of the Attendants of the Great Person, which was with him in the same Boate, after his Lord had spoken a little to him, said aloud; *My Lord would haue you know, that it is not of Pride, or Greatnes, that he commeth not aboard your Shipp; But for that, in your Answear, you declare, that you haue many Sick amongst you, he was warned by the* Conseruatour *of* Health, *of the* Citty, *that he should keepe a distance.* We bowed our selues towards him, and answered; *Wee were his humble Seruants; And accounted for great Honour, and singular Humanity towards vs, that which was allready done; But hoped well, that the Nature, of the Sicknes, of our Men, was not infectious.* So he returned; And a while after came the *Notary* to vs aboard our Ship; Holding in his hand a Fruit of that Cuntry, like an Orenge, but of colour between Orenge-tawney and Scarlett; which cast a most excellent Odour. He vsed it (as it seemeth) for a Preseruatiue against Infection. He gaue vs our Oath; *By the Name of Iesus, and his Merits*: And after told vs, that the next day, by sixe of the Clocke, in the Morning, we should be sent to, and brought to the *Strangers House*, (so he called it,) wher we should be accommodated of things, both for our VVhole, and for our Sick. So he left vs; And when we offred him some Pistoletts, 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 Seruice. For (as I after learned) they call an Officer, that taketh Rewards, *Twice-paid.*

The

The next Morning earely, ther came to vs the ſame *Officer*, that came to vs at firſt with his Cane, and told vs; *He came to conduct vs to the* Strangers Houſe; *And that hee had preuented the Houre, becauſe we might haue the whole day before vs, for our Buſineſſe. For* (ſaid he) *If you will follow my Aduice, ther ſhall firſt goe with me ſome few of you, and ſee the place, and how it may be made conuenient for you; And then you may ſend for your Sick, and the reſt of your Number, which yee will bring on Land.* We thanked him, and ſaid; *That this Care, which he tooke of deſolate Strangers,* GOD *would reward.* And ſo ſixe of vs went on Land with him: And when we were on Land, he went before vs, and turned to vs, and ſaid; *He was but our Seruant, and our Guide.* Hee ledd vs through three faire Streets; And all the way we went, ther were gathered ſome People on both ſides, ſtanding in a Rowe; But in ſo ciuill a faſhion, as if it had beene, not to wonder at vs, but to welcome vs: And diuers of them, as we paſſed by them, put their Armes a little abroad; which is their Geſture, when they bid any welcome. The *Strangers Houſe* is a faire and ſpacious Houſe, built of Brick, of ſomewhat a blewer Colour then our Brick; And with handſome windowes, ſome of Glaſſe, ſome of a kinde of Cambrick oyl'd. He brought vs firſt into a faire Parlour aboue ſtaires, and then asked vs; *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 ſeuenteene.* He deſired vs to haue patience a little, and to ſtay till he came back to vs; which was about an Houre after; And then hee led vs to ſee the Chambers, which were prouided for vs, being in number nineteene. They hauing caſt it (as it ſeemeth) that foure of thoſe Chambers, which were better then the reſt, might receiue foure of the principall Men of our Company; And lodge them alone by themſelues; And the other 15. Chambers were to lodge vs two and two together. The Chambers were handſome and cheerefull Chambers, and furniſhed ciuilly: Then he ledd vs to a long Gallery, like a Dorture, where hee

ſhewed vs all along the one ſide (for the other ſide was but VVall and VVindow,) ſeuenteene Cells, very neat ones, hauing partitions of Cedar wood. VVhich Gallery, and Cells, being in all fourty, (many more then we needed,) were inſtituted as an Infirmary for ſick Perſons. And he told vs withall, that as any of our Sick waxed well, he might be remoued from his Cell, to a Chamber: For which purpoſe, there were ſett forth ten ſpare Chambers, beſides the Number we ſpake of before. This done, he brought vs back to the Parlour, and lifting vp his Cane a little, (as they doe when they giue any Charge or Commaund) ſaid to vs; *Yee are to know, that the Cuſtome of the Land requireth, that after this day, and too morrow, (which we giue you for remouing of your people from your Ship,) you are to keepe within dores for three daies. But lett it not trouble you, nor doe not think your ſelues reſtrained, but rather left to your Reſt and Eaſe. You ſhall want nothing, and there are ſixe of our People appointed to attend you, for any Buſines you may haue abroad.* VVee gaue him thankes, with all Affection and Reſpect, and ſaid; GOD *ſurely is manifeſted in this Land.* VVee offred him alſo twenty Piſtoletts; But he ſmiled, and onely ſaide; *What? twice paid!* And ſo he left vs. Soone after our Dinner was ſerued in; VVhich was right good Viands, both for Bread, and Meate: Better then any *Collegiate* Diett, that I haue knowne in *Europe.* VVe had alſo Drinke of three ſorts, all wholeſome and good; VVine of the Grape; A Drink of Graine, ſuch as is with vs our Ale, but more cleare: And a kinde of Sider made of a Fruit of that Cuntry; A wonderfull pleaſing and Refreſhing Drink. Beſides, ther were brought in to vs, great ſtore of thoſe Scarlett Orenges, for our Sick; which (they ſaid) were an aſſured Remedy for ſicknes taken at Sea. Ther was giuen vs alſo, a Boxe of ſmall gray, or whitiſh Pills, which they wiſhed our Sicke ſhould take, one of the Pills, euery night before ſleepe; which (they ſaid) would haſten their Recouery. The next day, after that our Trouble of Carriage, and Remouing of our Men, and Goods, out of our Shipp, was ſomewhat ſetled and quiett, I thought good to call our

Company

Company together, and when they were assembled, said vnto them; *My deare Frends; Let vs know our selues, and how it standeth with vs. We are Men cast on Land, as* Ionas *was, out of the* Whales Belly, *when we were as buried in the Deepe: And now we are on Land, wee are but between Death and Life; For we are beyond, both the Old World, and the New; And whether euer wee shall see* Europe, God *onely knoweth. It is a kinde of Miracle hath brought vs hither: And it must bee little lesse, that shall bring vs hence. Therefore in regard of our Deliuerance past, and our danger present, and to come, let vs looke vp to* God, *and euery man reforme his owne wayes. Besides we are come here amongst a* Christian People, *full of Piety and Humanity: Let vs not bring that Confusion of face vpon our selues, as to shew our vices, or vnworthinesse before them. Yet there is more. For they haue by Commandement, (though in forme of Courtesie) Cloistered vs within these Walls, for three dayes: Who knoweth, whether it be not, to take some tast of our manners and conditions? And if they finde them bad, to banish vs straight-wayes; If good to giue vs further time. For these Men, that they haue giuen vs for Attendance, may withall haue an eye vpon vs. Therefore for* God's *loue, and as we loue the weale of our Soules and Bodies, let vs so behaue our selues, as wee may be at peace with* God, *and may finde grace in the Eyes of this People.* Our Company with one voice thanked me for my good Admonition, and promised me to liue soberly and ciuilly, and without giuing any the least occasion of Offence. So we spent our three dayes ioyfully, and without care, in expectation what would be done with vs, when they were expired. During which time, we had euery houre ioy of the Amendment of our Sick; who thought themselues cast into some Diuine *Poole* of *Healing*; They mended so kindely, and so fast.

The Morrow after our three dayes were past, ther came to vs a new Man, that we had not seen before, clothed in Blew as the former was, saue that his Turban was white, with a small red Crosse on the Topp. He had also a Tippet of fine Linnen. At his Comming in, he did bend to vs a

little, and put his Armes abroad. Wee of our parts ſaluted him in a very lowly and ſubmiſsiue manner; As looking that from him, wee ſhould receyue Sentence of Life, or Death. He deſired to ſpeak with ſome few of vs: Wherupon ſixe of vs onely ſtaied, and the reſt auoyded the Roome. He ſaid; *I am by Office Gouerner of this Houſe of Strangers, and by Vocation I am a* Chriſtian Prieſt; *And therfore am come to you, to offer you my ſeruice, both as Strangers, and chiefly as* Chriſtians. *Some things I may tell you, which I thinke you will not be vnwilling to heare. The State hath giuen you Licence to ſtay on Land, for the ſpace of ſixe weekes: And let it not trouble you, if your occaſions aske further time, for the Law in this point is not preciſe; And I doe not doubt, but my ſelfe ſhall be able, to obtaine for you, ſuch further time, as may be conuenient. Yee ſhall alſo vnderſtand, that the* Strangers Houſe, *is at this time Rich, and much aforehand; For it hath layd vp Reuenew theſe 37. yeares: For ſo long it is, ſince any Stranger arriued in this part: And therfore take yee no care; The* State *will defray you all the time you ſtay: Neither ſhall you ſtay one day the leſſe for that. As for any Merchandize yee haue brought, yee ſhall be well vſed, and haue your returne, either in Merchandize, or in Gold and Siluer: For to vs it is all one. And if you haue any other Requeſt to make, hide it not. For yee ſhall finde, we will not make your Countenance to fall, by the Anſwer ye ſhall receiue. Onely this I muſt tell you, that none of you muſt goe aboue a* Karan, (that is with them a Mile and an halfe) *from the walles of the Citty, without eſpeciall leaue.* We anſwered, after we had looked awhile one vpon another, admiring this gracious and parent-like vſage; *That we could not tell what to ſay: For wee wanted words to expreſſe our Thankes; And his Noble free Offers left vs nothing to aske. It ſeemed to vs, that we had before vs a picture of our* Saluation *in* Heauen: *For wee that were a while ſince in the Iawes of Death, were now brought into a place, where we found nothing but Conſolations. For the Commandement laid vpon vs, we would not faile to obey it, though it was impoſsible, but our Hearts ſhould be enflamed to tread further vpon this Happy and Holy Ground.*

Wee

Wee added; *That our Tongues should first cleaue to the Rooſes of our Mouthes, ere we ſhould forget, either his Reuerend Perſon, or this whole Nation, in our Prayers.* Wee alſo moſt humbly beſought him, to accept of vs as his true ſeruants, by as iuſt a Right, as euer Men on Earth were bounden; laying and preſenting, both our Perſons, and all we had, at his feete. He ſaid; *He was a Prieſt, and looked for a Prieſts reward; which was our Brotherly loue, and the Good of our Soules and Bodies.* So he went from vs, not without teares of Tenderneſſe in his Eyes; And left vs alſo confuſed with Ioy and Kindneſſe, ſaying amongſt our ſelues; *That wee were come into a Land of Angells, which did appeare to vs dayly, and preuent vs with Comforts, which we thought not of, much leſſe expected.*

The next day about 10. of the Clocke, the Gouernour came to vs againe, and after Salutations, ſaid familiarly; *That he was come to viſit vs*; And called for a Chaire, and ſatt him downe; And we being ſome 10. of vs, (the reſt were of the meaner Sort; or elſe gone abroad;) ſate down with him. And when we were ſett, he began thus. *Wee of this Iſland of Benſalem* (for ſo they call it in their Language) *haue this; That by meanes of our ſolitary Situation; and of the Lawes of Secrecy, which we haue for our Trauellers; and our rare Admiſſion of Strangers; we know well moſt part of the Habitable World, and are our ſelues vnknowne. Therefore becauſe he that knoweth leaſt, is fitteſt to aske Queſtions, it is more Reaſon, for the Entertainement of the time, that yee aske mee Queſtions, then that I aske you* We anſwered; *That wee humbly thanked him, that he would giue vs leaue ſo to doe: And that wee conceiued by the taſt wee had already, that ther was no wordly thing on Earth, more worthy to be knowne, then the State of that happy Land. But aboue all* (we ſaid) *ſince that wee were mett from the ſeuerall Ends of the World; and boped aſſuredly, that we ſhould meete one day in the* Kingdome *of* Heauen (*for that we were both parts* Chriſtians) *wee deſired to know (in reſpect that Land was ſo remote, and ſo diuided by vaſt and vnknowne Seas, from the Land, wher our* SAVIOVR *walked on Earth*)

who was the Apostle *of that Nation, and how it was conuerted to the* Faith? It appeared in his face, that he tooke great Contentment in this our Question: Hee said; *Yee knit my Heart to you, by asking this Question in the first place; For it sheweth that you* First seeke the Kingdome of Heauen; *And I shall gladly, and briefly, satisfie your demaund.*

About twenty Yeares after the Ascension of our SAVIOVR, *it came to passe, that ther was seen by the People of* Renfusa, *(a City vpon the Easterne Coast of our Island,) within Night, (the Night was Cloudy, and Calme,) as it might be some mile into the Sea, a great Pillar of Light; Not sharp, but in forme of a Columne, or* Cylinder, *rising from the Sea, a great way vp towards Heauen; and on the topp of it was seene a large Crosse of Light, more bright and resplendent then the Body of the Pillar. Vpon which so strange a Spectacle, the People of the Citty gathered apace together vpon the Sands, to wonder; And so after put themselues into a number of small Boates, to goe nearer to this Marueilous sight. But when the Boates were come within (about) 60. yeards of the Pillar, they found themselues all bound, and could goe no further; yet so as they might moue to goe about, but might not approach nearer: So as the Boates stood all as in a Theater, beholding this Light, as an Heauenly Signe. It so fell out, that ther was in one of the Boates, one of our Wise Men, of the Society of* Salomons House; *which* House, *or* Colledge *(my good Brethren) is the very Eye of this Kingdome; Who hauing a while attentiuely and deuoutly viewed, and contemplated this Pillar, and Crosse, fell downe vpon his face; And then raysed himselfe vpon his knees, and lifting vp his Hands to Heauen, made his prayers in this manner.*

LOrd God *of Heauen and Earth; thou hast vouchsafed of thy Grace, to those of our* Order, *to know thy Workes of Creation, and the Secretts of them; And to discerne (as farre as appertaineth to the Generations of Men) Between Diuine Miracles,*

racles, Workes of Nature, Works of Art, and Impostures and Illusions of all sorts. I doe here acknowledge and testifie before this People, that the Thing which we now see before our eyes, is thy Finger, *and a true* Miracle. *And for-as-much, as we learne in our Bookes, that thou neuer workest Miracles, but to a Diuine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but vpon great cause) wee most humbly beseech thee, to prosper this great Signe; And to giue vs the Interpretation and vse of it in Mercy; Which thou doest in some part secretly promise, by sending it vnto vs.*

When he had made his Prayer, hee presently found the Boate he was in, moueable and vnbound; whereas all the rest remained still fast; And taking that for an assurance of Leaue to approach, he caused the Boate to be softly, and with silence, rowed towards the Pillar. *But ere he came neere it, the* Pillar *and* Crosse *of* Light *brake vp, and cast it selfe abroad, as it were, into a Firmament of many Starres; which also vanished soone after, and there was nothing left to be seen, but a small* Arke, *or* Chest *of* Cedar, *dry, and not wett at all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small greene Branch of Palme; And when the wise Man had taken it, with all reuerence, into his Boate, it opened of it selfe, and there were found in it, a* Booke, *and a* Letter; *Both written in fine Parchment, and wrapped in Sindons of Linnen. The* Booke *conteined all the* Canonicall Bookes *of the* Old *and* New Testament, *according as you haue them; (For we know well what the* Churches *with you receiue;) And the* Apocalypse *it selfe; And some other* Bookes *of the* New Testament, *which were not at that time written, were neuertheleſſe in the* Booke. *And for the* Letter, *it was in these words.*

I Bartholomew

I Bartholomew, *a Seruant of the Highest, and Apostle of* IESVS CHRIST, *was warned by an Angell, that appeared to me, in a vision of Glory, that I should commit this* Arke *to the flouds of the Sea. Therefore, I doe testifie and declare, vnto that People, where* GOD *shall ordaine this* Ark *to come to Land, that in the same day, is come vnto them Saluation and Peace, and Good Will, from the* Father, *and from the* LORD IESVS.

There was also in both these writings, as well the Booke, *as the* Letter, *wrought a great Miracle, Conforme to that of the* Apostles, *in the Originall* Gift *of* Tongues. *For there being at that time, in this Land,* Hebrewes, Persians, *and* Indians, *besides the Natives, euery one redd vpon the* Booke, *and* Letter, *as if they had been written in his owne Language. And thus was this Land saued from Infidelity, (as the Remaine of the Old World was from Water) by an* Ark, *through the Apostolicall and Miraculous* Euangelisme *of* Saint Bartholomew. And here hee paused, and a Messenger came, and called him from vs. So this was all that passed in that Conference.

The next Day, the same Gouernour came againe to vs, immediately after Dinner, and excused himselfe, saying; *That the Day before, he was called from vs, somewhat abruptly, but now he would make vs amends, and spend time with vs; if we held his Company, and Conference agreeable.* Wee answered; *That wee held it so agreeable and pleasing to vs, as wee forgot both Dangers past, and Feares to come, for the time wee heard him speake; And that wee thought, an Howre spent with him, was worth Yeares of our former life.* He bowed himselfe a little to vs, and after we were set againe, he said; *Well, the Questions are on your part.* One of our Number said, after a little Pause; *That there was a Matter, wee were no lesse desirous to know, then fearefull to aske, least wee might presume too farre.*

But

But encouraged by his rare Humanity towards vs, (that could scarce thinke our selues Strangers, being his vowed and professed Seruants,) we would take the Hardines to propound it: Humbly beseeching him, if hee thought it not fit to bee answered, that hee would pardon it, though he reiected it. Wee said; *VVee well obserued those his words, which hee formerly spake, that this happy Island, wher we now stood, was knowne 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 Discoueries, and Nauigations of this last Age) neuer heard any of the least Inkling or Glimse of this Island. This we found wonderfull strange; For that all Nations haue Enterknowledge one of another, either by Voyage into Forraigne Parts, or by Strangers that come to them: And though the Trauailer into a Forreine Countrey, doth commonly know more by the Eye, then he that stayeth at home can by relation of the Trauailer; Yet both wayes suffice to make a mutuall Knowledge, in some degree, on both parts. But for this Island, wee neuer heard tell of any Shipp of theirs, that had been seene to arriue vpon any shore of* Europe; *No, nor of either the* East *or* West Indies, *nor yet of any Shipp of any other part of the World, that had made returne from them. And yet the Maruell rested not in this; For the Situation of it (as his Lordship said,) in the secret Conclaue of such a vast Sea mought cause it. But then, that they should haue Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it was a thing wee could not tell what to make of; For that it seemed to vs a condition and Proprietie of Diuine Powers and Beings, to be hidden and vnseene to others, and yet to haue others open, and as in a light to them.* At this speach the Gouernour gaue a gracious smile, and sayd; *That we did well to aske 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 Newes and Intelligence of other Countries.* It was answered by vs all, in all possible humblenes, but yet with a Countenance taking knowledge, that

we knew he spake it but merrily; *That we were apt enough to think, ther was somewhat supernaturall in this Island, but yet rather as Angelicall, then Magicall. But to let his Lordship know truely, what it was, that made vs tender and doubtful to aske this Question, it was not any such conceit, but because we remembred, he had giuen a Touch in his former Speach, that this Land had Lawes of Secrecy touching Strangers.* To this he said; *You remember it aright: And therefore in that I shall say to you, I must reserue some particulars, which it is not lawfull for mee to reueale; but there will bee enough left, to giue you satisfaction.*

You shall vnderstand (that which perhaps you will scarce think credible) that about three thousand Yeares agoe, or somewhat more, the Nauigation of the World (specially for remote Voyages) was greater then at this Day. Doe not thinke with your selues, that I know not how much it is encreased with you, within these sixescore Yeares: I know it well; And yet I say, greater then, than now: Whether it was, that the Example of the Ark, *that saued the Remnant of Men, from the* vniuersall Deluge, *gaue Men confidence to aduenture vpon the Waters; Or what it was; but such is the Truth. The* Phœniceans, *and specially the* Tyrians, *had great Fleetes. 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 haue now but Iunks, and Canoa's, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fifteene hundred strong Ships, of great content. Of all this, there is with you sparing Memory, or none; But we haue large Knowledge thereof.*

At that time, this Land was knowne and frequented by the Shipps and Vessells of all the Nations before named. And (as it commeth to passe) they had many times Men of other Countries, that were no Saylers, that came with them; As Persians, Chaldeans, Arabians; *So as almost all Nations of Might and Fame resorted hither; Of whom we haue some Stirps, and little Tribes with vs, at this day. And for our owne Ships, they went sundry Voyages; as well to your* Streights, *which you call the* Pillars *of* Hercules, *As to other parts in the*

Atlantique

Atlantique *and* Mediterrane Seas; *As to* Paguin, (*which is the same with* Cambaline) *and* Quinzy, *vpon the Orientall Seas, as farre 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, which is made by a great* Man *with you; that the Descendents of* Neptune *planted there; and of the Magnificent Temple, Pallace, Citie, and Hill; And the manifold streames of goody Nauigable Riuers, (which as so many Chaines enuironed the same Site, and Temple;) And the seuerall Degrees of Ascent, wherby Men did climb vp to the same, as if it had bin a* Scala Cæli; *be all Poetical & Fabulous: Yet so much is true, that the said Country of* Atlantis; *As well that of* Peru *then called* Coya, *as that of* Mexico *then named* Tyrambel, *were mighty & proud Kingdomes, in Armes, Shipping, and Riches: So Mighty, as at one time, (or at least within the space of* 10. *Yeares,) they both made two great Expeditions; They of* Tirambel *through the* Atlantique *to the* Mediterrane Sea; *and they of* Coya *through the South Sea vpon this our Island: And for the former of these, which was into* Europe, *the same Authour amongst you, (as it seemeth,) had some relation from the* Egyptian Priest, *whom he citeth. For assuredly such a thing ther was. But whether it were the Ancient* Athenians, *that had the glory of the Repulse, and Resistance of those Forces, I can say nothing: But certaine it is, there neuer came backe, either Ship, or Man, from that Voyage. Neither had the other Voyage of those of* Coya *vpon vs, 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 Warrier; Knowing well both his owne strength, and that of his Enemies; handled the matter so, as he cut off their Land-Forces, from their Ships; and entoyled both their Nauy, and their Campe, with a greater Power then theirs, both by Sea and Land: And compelled them to render themselues without striking stroke: And after they were at his Mercy, contenting himselfe onely with their Oath, that they should no more beare Armes against him, dismissed them all in safety. But the* Diuine Reuenge *ouertooke not long after those proud Enterprises. For within lesse then the space of one Hundred*

Yeares, the Great Atlantis *was vtterly lost and destroyed: Not by a great Earthquake, as your* Man *saith; (For that whole Tract is little subiect to Earthquakes;) But by a particular Deluge or Inundation; Those Countries hauing, at this Day, farr greater Riuers, and farr higher Mountaines, to poure downe waters, then any part of the Old World. But it is true, that the same Inundation was not deepe; Not past fourty foote, 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 saued by flying to the high Trees and Woods. For as for Men, although they had Buildings in many places, higher then 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 maruaile you not at the thin Population of* America, *nor at the Rudenesse and Ignorance of the People; For you must account your Inhabitants of* America *as a young People; Younger a thousand yeares, at the least, then the rest of the World: For that ther was so much time, betweene the* Vniuersall Floud, *and their* Particular Inundation. *For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Countrey againe slowly, by little and little; And being simple and sauage People, (Not like* Noah *and his* Sonnes, *which was the chiefe Family of the Earth) they were not able to leaue Letters, Arts, and Ciuillity, to their Posterity; And hauing likewise in their Mountanous Habitations beene vsed, (in respect of the Extreame Cold of those* Regions,) *to cloath themselues with the Skinns of Tygers, Beares, and great Hairy Goates, that they haue in those Parts; When after they came downe into the Valley, and found the Intollerable Heates which are there, and knew no meanes of lighter Apparell; they were forced to beginn the Custome of Going Naked, which continueth at this day. Onely they take great pride and delight, in the Feathers of Birds; And this also they tooke from those their Auncestours of the Mountaines, who were inuited vnto it, by the infinite Flights of Birdes, that came vp to the high Grounds, while the Waters stood below. So you see, by this maine Accident*

dent of Time, wee lost our Traffique with the Americans, *with whom, of all others, in regard they lay neareſt to vs, wee 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 naturall Reuolution of Time,) Nauigation did euery wher greatly decay; And ſpecially, farre Voyages, (the rather by the vſe of Gallies, and ſuch Veſſells as could hardly brooke the Ocean,) were altogether left and omitted. So then, that part of Entercourſe, which could bee from other Nations, to Sayle to vs, 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 yeeld you ſome other Cauſe. For I cannot ſay, (if I ſhall ſay truely,) but our Shipping, for Number, Strength, Marriners, Pylots, and all things that appertaine to Nauigation, is as great as euer; And therefore why we ſhould ſit at home, I ſhall now giue you an account by it ſelfe; And it will draw nearer, to giue you ſatisfaction, to your principall Queſtion.*

There raigned in this Iſland, about 1900. *yeares agoe, a* King, *whoſe memory of all others we moſt adore; Not Superſtitiouſly, but as a Diuine Inſtrument, though a Mortall Man: His Name was* Solamona: *And we eſteeme him as the* Law-giuer *of our Nation. This* King *had* a large heart, *inſcrutable for good; And was wholly bent to make his Kingdome and People Happy. He therefore taking into Conſideration, how ſufficient and ſubſtantiue this Land was, to maintaine it ſelf, without any ayd (at all) of the Forrainer; Being* 5600. *Miles in circuit, and of rare Fertility of Soyle, in the greateſt part thereof; And finding alſo the Shipping of this Country mought bee plentifully ſet on worke, both by Fiſhing, and by Tranſportations from Port to Port, and likewiſe by Sayling vnto ſome ſmall Iſlands that are not farre from vs, and are vnder the Crowne and Lawes of this* State; *And recalling into his Memory, the happy and flouriſhing Eſtate, wherein this Land then was; So as it mought bee a thouſand wayes altered to the worſe, but ſcarſe any one way to the better; thought nothing*

wanted to his Noble and Heroicall Intentions, but onely (as farr as Humane foresight mought reach) to giue perpetuitie to that, which was in his time so happily established. Therefore amongst his other Fundamentall Lawes of this Kingdome, he did ordaine the Interdicts and Prohibitions, which wee haue touching Entrance of Strangers; which at that time (though it was after the Calamity of America) *was frequent; Doubting Nouelties, and Commixture of Manners. It is true, the like Law, against the Admission of Strangers without License, is an Ancient Law, in the Kingdome of* China, *and yet continued in vse. But ther it is a poore Thing; And hath made them a curious, ignorant, fearefull, foolish Nation. But our* Law-giuer *made his Law of another temper. For first, hee hath preserued all points of Humanity, in taking Order, and making Prouision for the Reliefe of Strangers distressed; whereof you haue tasted.* At which Speach (as reason was) wee all rose vp, and bowed our selues. Hee went on. *That* King *also still desiring to ioyne Humanity and Pollicy together; And thinking it against Humanity, to detaine Strangers here against their wills; And against Pollicy, that they should returne, and discouer their Knowledge of this Estate, he tooke this Course: He did ordaine, that of the Strangers, that should be permitted to Land, as many (at all times) mought depart as would; But as many as would stay, should haue very good Conditions, and Meanes to liue, from the* State. *Wherein hee saw so farre, that now in so many Ages since the Prohibition, wee haue memory not of one Shipp that euer returned, and but of thirteene Persons only, at seuerall times, that chose to returne in our Bottomes. What those few that returned may haue reported abroad I know not. But you must thinke, Whatsoeuer they haue said, could bee taken where they came, but for a Dreame. Now for our Trauelling from hence into Parts abroad, our* Law-giuer *thought fit altogether to restraine it. So is it not in* China. *For the* Chinetes *sayle where they will, or can; which sheweth, that thier Law of Keeping out Strangers, is a Law of Pusillanimity, and feare. But this restraint of ours, hath one onely Exception, which is admirable; Preseruing the good which commeth*

meth by communicating with Strangers, and auoyding the Hurt; And I will now open it to you. And here I shall seeme a little to digresse, but you will by and by finde it pertinent. Yee shall vnderstand, (my deare Friends,) that amongst the Excellent Acts of that King, one aboue all hath the prehemінence. It was the Erection, and Institution of an Order, or Society, which wee call Salomons House; The Noblest Foundation, (as wee thinke,) that euer was vpon the Earth; And the Lanthorne of this Kingdome. It is dedicated to the Study of the Works, and Creatures of GOD. Some thinke it beareth the Founders Name a little corrupted, as if it should be Solamona's House But the Records write it, as it is spoken. So as I take it to bee denominate of the King of the Hebrewes, which is famous with you, and no Stranger to vs. For wee haue some Parts of his works, which with you are lost; Namely that Naturall History, which hee wrote of all Plants, from the Cedar of Libanus, to the Mosse that groweth out of the Wall; And of all things that haue Life and Motion. This maketh me thinke, that our King finding himselfe to Symbolize, in many things, with that King of the Hebrewes (which liued many yeares before him) honoured him with the Title of this Foundation. And I am the rather induced to be of this Opinion, for that I finde in ancient Records, this Order or Societie is sometimes called Salomons House; And sometimes the Colledge of the sixe Daies Workes: wherby I am satisfied, That our Excellent King had learned from the Hebrewes; That GOD had created the World, and all that therin is, within sixe Dayes; And therefore hee instituting that House, for the finding out of the true Nature of all Things, (wherby GOD mought haue the more Glory in the Workemanship of them, and Men the more fruit in the vse of them,) did giue it also that second Name. But now to come to our present purpose. When the King had forbidden, to all his People, Nauigation into any Part, that was not vnder his Crowne, he made neuertheless this Ordinance; That euery twelue yeares ther should be set forth, out of this Kingdome, two Ships, appointed to seuerall Voyages; That in either of these Shipps, ther should be a Mission of three of the Fellowes, or Brethren of Salomons House;

whose

whose Errand was onely to giue vs Knowledge of the Affaires and State of those Countries, to which they were designed; And especially of the Sciences, Arts, Manufactures, and Inuentions of all the World; And withall to bring vnto vs, Bookes, Instruments, and Patternes, in euery kinde: That the Ships, after they had landed the Brethren, *should returne; And that the* Brethren *should stay abroad till the new Mission. These Ships are not otherwise fraught, then with Store of Victualls, and good Quantitie of Treasure to remaine with the* Brethren, *for the buying of such Things, and rewarding of such Persons, as they should thinke fit. Now for me to tell you, how the Vulgar sort of Marriners are contained from being discouered at Land; And how they that must be put on shore for any time, colour themselues vnder the Names of other Nations; And to what places these Voyages haue beene designed; And what places of* Rendez-Vous *are appointed for the new Missions; And the like Circumstances of the Practique; I may not doe it; Neither is it much to your desire. But thus you see, wee maintaine a Trade, not for Gold, Siluer, or Iewels; Nor for Silkes; Nor for Spices; Nor any other Commodity of Matter; But onely for* GODS *first Creature, which was* Light: *To haue* Light (*I say*) *of the Growth of all Parts of the World.* And when hee had said this, he was silent; And so were wee all. For indeed wee were all astonished, to heare so strange things so probably told. And hee perceiuing, that wee were willing to say somewhat, but had it not ready, in great Courtesie tooke vs off, and descended to aske vs Questions of our Voyage and Fortunes, and in the end concluded, that we mought doe well, to thinke with our selues, what Time of stay wee would demand of the State; And bad vs not to scant our selues; For he would procure such time as wee desired. Wherevpon wee all rose vp, and presented our selues to kisse the skirt of his Tippet; But hee would not suffer vs; and so tooke his leaue. But when it came once amongst our People, that the State vsed to offer Conditions to Strangers, that would stay, wee had Worke enough to get any of our Men to looke to our Shipp; And

to

to keepe them from going presently to the Gouernour, to craue Conditions. But with much adoe wee refrained them, till we mought agree what Course to take.

We took our selues now for free men, seeing ther was no danger of our vtter Perdition; And liued most ioyfully, going abroad, and seeing what was to be seen, in the Citty, and places adiacent, within our *Tedder*; And obtaining Acquaintance with many of the Citty, not of the meanest Quallity; 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 vs forget all that was deare to vs, in our owne Countries: And continually we mett with many things, right worthy of Obseruation, & Relation: As indeed, if ther be a Mirrour in the World, worthy to hold Mens Eyes, it is that Countrey. One day there were two of our Company bidden to a *Feast* of the *Family*, as they call it. A most Naturall, Pious, & Reuerend Custome it is, shewing that Nation to be compounded of all Goodnes. This is the manner of it. It is granted to any Man, that shall liue to see thirty Persons, descended of his Body, aliue together, and all aboue 2. yeares 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 dayes before the *Feast*, taketh to him three of such Friends as he liketh to chuse; And is assisted also by the Gouernour of the Citty, or Place, where the *Feast* is celebrated; And all the *Persons* of the *Family*, of both Sexes, are summoned to attend him. These two dayes the *Tirsan* sitteth in Consultation, cõcerning the good Estate of the *Family*. Ther, if ther be any Discord or sutes betweene any of the Family, they are compounded and appeased. Ther, if any of the Family bee Distressed or Decayed, order is taken for their Reliefe, and competent meanes to liue. Ther, if any bee subiect to vice, or take ill Courses, they are reproued and Censured. So likewise, Direction is giuen touching Marriages, and the Courses of life, which any of them should take, with diuers other the like Orders and Aduises. The Gouernour assisteth, to the end, to put in Execution, by his

Publicke Authority, the Decrees and Orders of the *Tirſan*, if they ſhould bee diſobeyed; Though that ſeldome needeth; Such Reuerence and Obedience they giue, to the Order of Nature. The *Tirſan* doth alſo then, euer chuſe one Man from amongſt his Sonnes, to liue in Houſe with him; Who is called, euer after, the *Sonne of the Vine*. The Reaſon will hereafter appeare. On the *Feaſt* day, the *Father* or *Tirſan* commeth forth after Diuine Seruice, into a large Roome, where the *Feaſt* is celebrated; Which Roome hath an Halfe-Pace at the vpper end. Againſt the wall, in the middle of the halfe-pace, is a Chaire placed for him, with a Table and Carpet before it. Ouer the Chaire is a State, made Round or Ouall, and it is of Iuy; An Iuy ſomewhat whiter then ours, like the Leafe of a Siluer Aspe, but more ſhining; For it is greene all Winter. And the State is curiouſly wrought with Siluer and Silke of diuers Colours, broyding or binding in the Iuy; And is euer of the worke, of ſome of the Daughters of the Family; And vailed ouer at the Topp, with a fine Nett of Silke and Siluer. But the Subſtance of it, is true Iuy; wherof, after it is taken downe, the Friends of the Family, are deſirous to haue ſome Leafe or Sprigg to keepe. The *Tirſan* 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 Trauerſe placed in a Loft aboue, on the right hand of the Chaire, with a priuy Dore, and a carued Window of Glaſſe, leaded with Gold and blew; Wher ſhee ſitteth, but is not ſeene. When the *Tirſan* is come forth, he ſitteth downe in the Chaire; And all the Linage place themſelues againſt the wall, both at his back, and vpon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sexe, and ſtand vpon their Feete. When hee is ſett, the Roome being alwaies full of Company, but well kept and without Diſorder, after ſome pauſe, there commeth in from the lower ende of the Roome, a *Taratan*, (which is as much as an *Herald*;)

And

And on either ſide of him two *young Lads*; Wherof one carrieth a Scrowle of their ſhining yellow Parchment; And the other a Cluſter of Grapes of Gold, with a long Foote or Stalke. The *Herald*, and *Children*, are cloathed with Mantles of Sea-water greene Sattin; But the *Heralds* Mantle is ſtreamed with Gold, and hath a Traine. Then the *Herald* with three Curteſies, or rather Inclinations, commeth vp as farre as the Halfe-pace; And ther firſt taketh into his Hand the Scrowle. This Scrowle is the *Kings Charter*, containing Guift of Reuenew, and manany Priuiledges, Exemptions, and Points of Honour, granted to the *Father* of the *Family*; And it is euer-ſtiled and directed; *To ſuch an one, Our Welbeloued Friend and Creditour*: Which is a Title proper onely to this Caſe. For they ſay, the King is Debter to no Man, but for Propagation of his Subiects, The Seale ſet to the *Kings Charter*, is the Kings Image, Imboſſed or moulded in Gold; And though ſuch *Charters* bee expedited of Courſe, and as of Right, yet they are varied by diſcretion, according to the Number and Dignitie of the *Family*. This *Charter* the *Herald* readeth aloud; And while it is read, the *Father* or *Tirſan*, ſtandeth vp, ſupported by two of his Sonnes, ſuch as hee chooſeth. Then the *Herald* mounteth the Half-Pace, and deliuereth 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 Cluſter of Grapes, which is of Gold; Both the Stalke, and the Grapes. But the Grapes are daintely enamelled; And if the Males of the *Family* be the greater number, the Grapes are enamelled Purple, with a little Sunne ſett on the Topp; If the Females, then they are enamelled into a greeniſh yellow, with a Creſſant on the Topp. The Grapes are in number as many as there are Deſcendents of the *Family*. This Golden Cluſter, the *Herald* deliuereth alſo to the *Tirſan*; Who preſently deliuereth it ouer, to that Sonne, that hee had for-

merly chosen, to bee in House with him; Who beareth it before his *Father*, as an Ensigne of Honour, when he goeth in publicke euer after; And is thereupon called *the Sonne of the Vine.* After this Ceremony ended, the *Father* or *Tirsan* retireth; And after some time commeth forth againe to Dinner, where he sitteth alone vnder the State, as before; And none of his Descendants sit with him, of what Degree or Dignitie soeuer, except he hap to be of *Salomons House.* Hee is serued onely by his owne Children, such as are Male; who performe vnto him all seruice of the Table vpon the knee; And the Women only stand about him, leaning against the wall. The Roome belowe the Halfe-pace, hath Tables on the sides for the Ghests that are bidden; Who are serued with great and comely order; And towards the end of Dinner (which in the greatest Feasts with them, lasteth neuer aboue an Houre and an halfe) there is an *Hymne* sung, varied according to the Inuention of him that composeth it; (for they haue excellent Poesie;) But the Subiect of it is, (alwayes,) the prayses of *Adam*, and *Noah*, and *Abraham*; Wherof the former two Peopled the World, and the last was the *Father* of the *Faithfull*: Concluding euer with a Thankesgiuing for the *Natiuitie* of our *Sauiour*, in whose Birth, the Births of all are onely Blessed. Dinner being done, the *Tirsan* retireth againe; And hauing withdrawne himselfe alone into a place; where hee maketh some priuate Prayers, hee commeth foorth the third time, to giue the Blessing; 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 bee inuerted. The person that is called, (the Table being before remoued,) kneeleth downe before the Chaire, and the *Father* layeth his Hand, vpon his Head, or her Head, and giueth the Blessing in these Wordes; *Sonne 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 Euerlasting Father,*

the

the Prince of Peace, and the Holy Doue, bee vpon thee, and make the dayes of thy Pilgrimage, good, and many. This he ſaith to euery of them; And that done, if there be any of his Sonnes, of eminent Meritt and Vertue, (ſo they be not aboue two,) hee calleth for them againe; And ſaith, laying his Arme ouer their ſhoulders, they ſtanding; *Sonnes, it is well yee are borne, giue God the prayſe, and perſeuere to the end.* And withall deliuereth to either of them a Iewel, made in the Figure of an Eare of Wheat, which they euer after weare 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, ſixe or ſeuen Dayes were ſpent, I was fallen into ſtraight Acquaintance, with a *Merchant* of that *Citty*, whoſe Name was *Ioabin* Hee was a *Iew* and *Circumciſed*: For they haue ſome few Stirps of *Iewes*, yet remaining amongſt them, whom they leaue to their owne Religion. Which they may the better doe, becauſe they are of a farre differing Diſpoſition from the *Iewes* in other Parts. For whereas they hate the *Name* of CHRIST; And haue a ſecret inbred Rancour againſt the People amongſt whom they liue; Theſe (contrariwiſe) giue vnto our SAVIOVR many high Attributes, and loue the *Nation* of *Benſalem*, extreamely. Surely this Man, of whom I ſpeake, would euer acknowledge, that CHRIST was borne of a *Virgin*; And that hee was more then a Man; And hee would tell how GOD made him Ruler of the *Seraphims*, which guard his Throane; And they call him alſo the *Milken Way*, and the *Eliah* of the *Meſſiah*; And many other High Names; which though they be inferiour to his Diuine Maieſtie, Yet they are farre from the Language of other *Iewes*. And for the Countrey of *Benſalem*, this Man would make no end of commending it; Being deſirous by Tradition amongſt the *Iewes* there, to haue it beleeued, that the People thereof were of the Generations of *Abraham*, by another Sonne, whom they call *Nachoran*; And

that *Moses* by a secret *Cabala* ordained the Lawes of *Bensalem* which they now vse; And that when the *Messiah* should come, and sit in his Throne at *Hierusalem*, the King of *Bensalem*, should sit at his feete, whereas other Kings should keepe a great distance. But yet setting aside these *Iewish* Dreames, the Man was a wise Man, and learned, and of great Pollicy, and excellently seene in the Lawes 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 neuer heard of a Solemnity, wherein Nature did so much preside. And because Propagation of Families, proceedeth from the Nuptiall Copulation, I desired to know of him, what Lawes and Customes they had concerning Marriage; And whether they kept Marriage well; And whether they were tyed to one Wife; For that wher Population is so much affected, and such as with them it seemed to be, ther is commonly Permission of *Plurality* of *Wiues*. To this he said; *You haue Reason for to commend that excellent Institution of the* Feast *of the* Family. *And indeed wee haue Experience, that those Families, that are partakers of the Blessing of that Feast, doe flourish and prosper euer after, in an extraordinary manner. But heare mee now, and I will tell you what I know. You shall vnderstand, that there is not vnder the Heauens, so chast a Nation, as this of Bensalem; Nor so free from all Pollution, or foulenesse. It is the Virgin of the World. I remember, I haue read in one of your* Europæan *Bookes, of an holy Hermit amongst you, that desired to see the* Spirit *of* Fornication, *and there appeared to him, a little foule vgly* Aethiope. *But if he had desired to see the* Spirit *of* Chastitie *of* Bensalem, *it would haue appeared to him, in the likenes of a faire beautifull* Cherubin. *For there is nothing, amongst Mortall Men, more faire and admirable, then the Chast Mindes of this People. Know therefore, that with them ther are no Stewes, no dissolute Houses, no Cortisans, nor any thing of that kind. Nay they wonder (with detestation) at you in* Europe, *which*

permit

permit such things. They say ye haue put Marriage out of office: For Marriage is ordained a Remedy for vnlawfull Concupiscence; And Naturall Concupiscence seemeth as a spurr to Marriage. But when Men haue at hand a Remedy, more agreeable to their corrupt will, Marriage is almost expulsed. And therefore ther are with you seene infinite Men, that marry not, but chuse rather a libertine and impure single Life, then to be yoaked in Marriage; And many that doe marry, marry late, when the Prime and Stength of their Ieares is past. And when they doe marry, what is Marriage to them, but a very Bargaine; Wherin is sought Alliance, or Portion, or Reputation, with some desire (almost indifferent) of Issue; And not the faithfull Nuptiall Vnion of Man and Wife, that was first instituted. Neither is it possible, that those that haue cast away so basely, so much of their Strength, should greatly esteeme Children, (being of the same Matter,) as Chast Men doe. So Likewise during Marriage is the Case much amended, as it ought to bee if those things were tolerated onely for necessitie? No, but they remaine still as a very Affront to Marriage. The Haunting of those dissolute places, or resort to Curtizans, are no more punished in Married Men, then in Batchellers. And the depraued Custome of change, and the Delight in Meretricious Embracements, (wher sinne is turned into Art,) maketh Marriage a dull thing, and a kinde of Imposition, or Taxe. They heare you defend these things, as done to auoyd greater Euills; As Aduoutries, Deflouring of Virgins, Vnnaturall lust, and the like. But they say, this is a preposterous Wisdome; And they call it Lot's offer, *who to saue his Guests from abusing, Offered his Daughters: Nay they say further, That ther is little gained in this; For that the same Vices and Appetites, doe still remayne and abound; Vnlawfull Lust being like a Furnace, that if you stopp the Flames altogether, it will quench; But if you giue it any vent, it will rage. As for Masculine Loue, they haue no touch of it; And yet ther are not, so faithfull and inuiolate Freindshipps, in the world againe, as are ther: And to speake generally, (as I said before,) I haue not read of any such Chastity, in any People, as theirs: And their vsuall saying is,* That whosoeuer is vnchast cannot reuerence himselfe: *And they say;*

That

That the Reuerence of a Mans selfe, is, next Religion, the chiefest Bridle of all Vices. And when hee had said this, the good *Iew* paused a little; Whereupon, I farr more willing to heare him speake on, then to speake my selfe; yet thinking it decent, that vpon his pause of Speech, I should not be altogether silent, said onely 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 confesse the* Righteousnesse *of* Bensalem, *was greater then the* Righteousnesse *of* Europe. At which speech hee bowed his Head, and went on in this manner. *They haue also many wise and excellent Lawes touching* Marriage. *They allow no* Polygamy. *They haue ordained that none doe intermarry or contract, vntill a Moneth bee past from their first Inter-viewe.* Marriage *without consent of Parents they doe not make void, but they mulct it in the Inheritours: For the Children of such* Marriages, *are not admitted to inherit, aboue a third Part of their Parents Inheritance. I haue read in a* Booke *of one of your* Men, *of a* Faigned Common-wealth, *wher the Married Couple are permitted, before they Contract, to see one another Naked. This they dislike: For they thinke it a Scorne, to giue a Refusall after so Familiar Knowledge: But because of many hidden Defects in Men and Womens Bodies, they haue a more ciuill Way: For they haue neare euery Towne, a Couple of* Pooles, (*which they call* Adam *and* Eues Pooles,) *wher it is permitted to one of the Friends of the Man, and another of the friends of the Woman, to see them seuerally both Naked.*

And as wee were thus in Conference, ther came one that seemed to be a Messenger, in a rich Huke, that spake with the *Iew*: Whereupon hee turned to mee, and said; *You will pardon mee, for I am commanded away in hast.* The next Morning he came to me againe, ioyfull as it seemed, and said; *There is word come to the Gouernour of the Citty, that one of the* Fathers *of* Salomons House, *will be here this day Seuen-night: Wee haue seene none of them this Dozen Yeares. His Comming is in State; But the Cause of his comming is secret. I will prouide you, and your Fellowes, of a good*

Standing

Standing, to see his Entry. I thanked him, and told him; *I was most glad of the Newes.* 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 pittied Men. He was cloathed in a Roabe of fine black Cloath, with wide Sleeues, and a Cape. His vnder Garment was of excellent white Linnen, downe to the Foote, girt with a Girdle of the same; And a Sindon or Tippett of the same about his Neck. He had Gloues, that were curious, and sett with Stone; And Shoes of Peach-coloured Veluet. His Neck was bare to the Shoulders. His Hatt was like a Helmett, or *Spanish Montera*; And his Locks curled below it decently: They were of Colour browne. His Beard was cutt round, and of the same colour with his Haire, somewhat lighter. He was carried in a rich Chariott, without Wheeles, Litter-wise; With two Horses at either end, richly trapped in blew Veluett Embroydered; and two Footmen on each side in the like Attire. The Chariott was all of Cedar, gilt, and adorned with Crystall; Saue that the Fore-end had Pannells of Sapphires, set in Bordets of Gold; And the Hinder-end the like of Emerauds of the *Peru* Colour. Ther was also a Sunn of Gold, Radiant, vpon the Topp, in the Midst; And on the Topp before, a small *Cherub* of Gold, with Wings displayed. The Chariott was couered with Cloath of Gold tissued vpon Blew. He had before him fifty Attendants, young Men all, in white *Satten* loose Coates to the Mid Legg; And Stockins of white Silk; And Shoes of blew Veluet; And Hatts of blew Veluett; with fine Plumes of diuerse Colours, sett round like Hat-bands. Next before the Chariott, went two Men, bare headed, in Linnen Garments downe to the Foote, girt, and Shoes of blew Veluett; Who carried, the one a Crosier, the other a Pastorall Staffe like a Sheephooke: Neither of them of Mettall, but the Crosier of Balme-wood, the Pastorall Staffe of Cedar. Horse-Men he had none, neither before, nor behinde his Chariott: As it seemeth to auoyd all Tumult and Trouble. Behinde

his Chariott, went all the Officers and Principalls of the Companies of the Citty. He ſate alone, vpon Cuſhions, of a kinde of excellent Pluſh, blew; And vnder his Foote curious Carpetts of Silk of diuerſe Colours, like the Perſian, but farr finer. He held vp his bare Hand, as he went, as bleſsing the People, but in Silence. The Street was wonderfully well kept; So that ther was neuer any Army had their Men ſtand in better Battell-Array, then the People ſtood. The Windowes likewiſe were not crouded, but euery one ſtood in them, as if they had been placed. When the ſhew was paſt, the *Iew* ſaid to me; *I ſhall not be able to attend you as I would, in regard of ſome charge the Citty hath lay'd vpon me, for the Entertaining of this Great Perſon.* Three dayes after the *Iew* came to me againe, and ſaid; *Yee are happy Men; for the* Father *of* Salomons Houſe *taketh knowledge of your Being here, and commanded me to tell you, that he will admitt all your Company to his preſence, and haue priuate Conference with one of you, that ye ſhall chooſe: And for this hath appointed the next day after too Morrow. And becauſe he meaneth to giue you his Bleſsing, he hath appointed it in the Forenoone.* We came at our Day, and Houre, and I was choſen by my Fellowes for the priuate Acceſſe. We found him in a faire Chamber, richly hanged, and carpetted vnder Foote, without any Degrees to the State. He was ſett vpon a Low Throne richly adorned, and a rich Cloath of State ouer his Head, of blew Sattin Embroidered. He was alone, ſaue that he had two Pages of Honour, on either Hand one, finely attired in White. His Vnder Garments were the like that we ſaw him weare in the Chariott; but in ſtead of his Gowne, he had on him a Mantle with a Cape, of the ſame fine Black, faſtned about him. When we came in, as we were taught, we bowed Lowe at our firſt Entrance; And when we were come neare his Chaire, he ſtood vp, holding forth his Hand vngloued, and in Poſture of Bleſsing; And we euery one of vs ſtooped downe, and kiſſed the Hemme of his Tippett. That done, the reſt departed, and I remayned.

Then

Then hee warned the Pages forth of the Roome, and caused mee to sit downe beside him, and spake to me thus in the *Spanish Tongue.*

GOD *blesse thee, my Sonne; I will giue thee the greatest Jewell I haue: For I will impart vnto thee, for the Loue of* GOD *and Men, a Relation of the true State of* Salomons House. *Sonne, to make you know the true state of* Salomons House, *I will keepe this order. First I will set forth vnto you the* End *of our* Foundation. *Secondly, the* Preparations *and* Instruments *we haue for our* Workes. *Thirdly, the seuerall* Employments *and* Functions *wherto our* Fellowes *are assigned. And fourthly, the* Ordinances *and* Rites *which we obserue.*

The End *of our* Foundation *is the Knowledge of* Causes, *and Secrett 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 haue large and deepe* Caues *of seuerall Depths: The deepest are sunke* 600. *Fathome: And some of them are digged and made vnder great Hills and Mountaines: So that if you reckon together the Depth of the Hill, and the Depth of the* Caue, *they are (some of them) aboue three*

Miles deepe. For wee finde, that the Depth of a Hill, and the Depth of a Caue *from the Flat, is the same Thing; Both remote alike, from the* Sunn *and Heauens Beames, and from the Open Aire. These* Caues *we call the* Lower Region; *And wee vse them for all* Coagulations, Indurations, Refrigerations, *and* Conseruations *of* Bodies. *We vse them likewise for the* Imitation *of* Naturall Mines; *And the* Producing *also of* New Artificiall Mettalls, *by* Compositions *and* Materialls *which we vse, and lay ther for many yeares. Wee vse them also sometimes, (which may seeme strange,) for* Curing *of some* Diseases, *and for* Prolongation *of* Life, *in some* Hermits *that choose to liue ther, well accommodated of all things necessarie, and indeed liue very long; By whom also we learne many things.*

We haue Burialls *in seuerall* Earths, *wher we put diuerse* Cements, *as the* Chineses *doe their* Porcellane. *But we haue them in greater Varietie, and some of them more fine. We haue also great variety of* Composts, *and* Soiles, *for the Making of the Earth Fruitfull.*

We haue High Towers; *The Highest about halfe a Mile in Heigth; And some of them likewise set vpon High* Mountaines: *So that the Vantage of the Hill with the* Tower, *is in the highest of them three Miles at least. And these Places wee call the* Vpper Region; *Accounting the Aire betweene the* High Places, *and the*

Lowe,

Lowe, *as a* Middle Region. *VVee vse these* Towers, *according to their seuerall Heights, and Situations, for* Insolation, Refrigeration, Conseruation; *And for the* View *of diuers* Meteors; *As* VVindes, Raine, Snow, Haile; *And some of the* Fiery Meteors *also. And vpon them, in some Places, are Dwellings of* Hermits, *whom wee visit sometimes, and instruct what to obserue.*

We haue great Lakes, *both* Salt, *and* Fresh; *wherof we haue vse for the* Fish, *and* Fowle. *We vse them also for* Burialls *of some* Naturall Bodies: *For we finde a Difference in Things buried in* Earth, *or in* Aire *below the* Earth; *and things buried in* VVater. *VVe haue also* Pooles, *of which some doe straine* Fresh VVater *out of* Salt; *And others by Art doe turne* Fresh VVater *into* Salt. *VVe haue also some* Rocks *in the Midst of the* Sea; *And some* Bayes *vpon the* Shore *for some* VVorks, *wherin is required the* Ayre *and* Vapour *of the* Sea. *VVe haue likewise* Violent Streames *and* Cataracts, *which serue vs for many* Motions: *And likewise* Engines *for* Multiplying *and* Enforcing *of* VVindes, *to set also on going diuerse* Motions.

VVe haue also a Number of Artificiall VVels, *and* Fountaines, *made in Imitation of the* Naturall Sources *and* Baths; *As tincted vpon* Vitrioll, Sulphur, Steele, Brasse, Lead, Nitre, *and other* Mineralls. *And againe wee haue little*

VVells *for* Infusions *of many* Things, *wher the* VVaters *take the Vertue quicker and better, then in* Vessells, *or* Basins. *And amongst them we haue a* VVater, *which wee call* VVater *of* Paradise, *being, by that we doe to it, made very Soueraigne for* Health, *and* Prolongation *of* Life.

We haue also Great *and* Spatious Houses, *wher we imitate and demonstrate* Meteors; *As* Snow, Haile, Raine, *some* Artificiall Raines *of* Bodies, *and not of* VVater, Thunders, Lightnings; *Also* Generations *of* Bodies *in* Aire; *As* Froggs, Flies, *and diuerse Others.*

We haue also certaine Chambers, *which wee call* Chambers *of* Health, *wher wee qualifie the* Aire *as we thinke good and proper for the* Cure *of diuerse* Diseases, *and* Preseruation *of* Health.

Wee haue also faire and large Baths, *of seuerall* Mixtures, *for the* Cure *of* Diseases, *and the* Restoring *of* Mans Body *from* Arefaction: *And Others for the* Confirming *of it in* Strength *of* Sinnewes, Vitall Parts, *and the very* Iuyce *and* Substance *of the* Body.

We haue also large and various Orchards, *and* Gardens; *Wherin we do not so much respect Beauty, as Variety of Ground and Soyle, proper for diuerse* Trees, *and* Herbs: *And some very spatious, wher* Trees, *and* Berries *are set, wherof we make diuerse Kinds of* Drinks, *besides the* Vine-yards. *In these wee practise likewise all Conclusions of* Grafting, *and* Inoculating, *as well of* VVilde-Trees,

as

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, then their* Seasons; *And to come vp and beare more speedily then by their* Naturall Course *they doe. We make them also by* Art *greater much then their* Nature; *And their* Fruit *greater, and sweeter, and of differing* Tast, Smell, Colour, *and* Figure, *from their* Nature. *And many of them we so Order as they become of* Medicinall Vse.

Wee haue also Meanes to make diuerse Plants, *rise by* Mixtures *of* Earths *without* Seedes; *And likewise to make diuerse New* Plants, *differing from the Vulgar; and to make one* Tree *or* Plant *turne into another.*

We haue also Parks, *and* Enclosures *of all Sorts, of* Beasts, *and* Birds; *which wee vse not onely for View or Rarenesse, but likewise for* Dissections, *and* Trialls; *That therby we may take light, what may be wrought vpon the* Body *of* Man. *Wherein we finde many strange Effects; As* Continuing Life *in them, though diuerse* Parts, *which you acount* Vitall, *be perished, and taken forth;* Resusitating *of some that seeme* Dead *in* Appearance; *And the like. We try also all* Poysons, *and other* Medicines *vpon them, as well of* Chyrurgery, *as* Phisicke. *By* Art *likewise, we make them* Greater, *or* Taller, *then their* Kinde *is; And contrary-wise* Dwarfe *them and stay their* Grouth:

Wee

Wee make them more Fruitfull, *and* Bearing *then their* Kind *is ; And contrary-wise* Barren *and not* Generatiue. *Also we make them differ in* Colour, Shape, Actiuity, *many wayes. We finde Meanes to make* Commixtures *and* Copulations *of diuerse* Kindes ; *which haue procuced many* New Kindes, *and them not* Barren, *as the generall Opinion is. We make a Number of* Kindes, *of* Serpents, Wormes, Flies, Fishes, *of* Putrefaction ; *Wherof some are aduanced (in effect) to be* Perfect Creatures, *like* Beastes, *or* Birds ; *And haue* Sexes, *and doe* Propagate. *Neither doe we this by* Chance, *but wee know before hand, of what* Matter *and* Commixture, *what* Kinde *of those* Creatures *will arise.*

Wee haue also Particular Pooles, *wher we make* Trialls *vpon* Fishes, *as we haue said before of* Beasts, *and* Birds.

Wee haue also Places *for* Breed *and* Generation *of those* Kindes *of* Wormes, *and* Flies, *which are of* Speciall Vse ; *Such as are with you your* Silk-wormes, *and* Bees.

I will not hold you long with recounting of our Brew-Howses, Bake-Howses, *and* Kitchins, *wher are made diuerse* Drinks, Breads, *and* Meats, *Rare, and of speciall Effects.* Wines *we haue of* Grapes ; *And* Drinkes *of other* Iuyce, *of* Fruits, *of* Graines, *and of* Rootes ; *And of* Mixtures *with* Honey, Sugar, Manna, *and* Fruits dryed, *and* decocted : *Also of the* Teares *or* Woundings

dings, *of* Trees; *And of the* Pulp *of* Canes. *And these* Drinkes *are of seuerall* Ages, *some to the* Age *or Last of fourtie yeares. We haue* Drinks *also brewed with seuerall* Herbs, *and* Roots, *and* Spices; *Yea with seuerall* Fleshes, *and* White-Meates; *Wherof some of the* Drinkes *are such, as they are in effect* Meat *and* Drinke *both: So that Diuerse, especially in* Age, *doe desire to liue with them, with little or no* Meate, *or* Bread. *And aboue all wee striue to haue* Drinks *of* Extreame Thin Parts, *to insinuate into the* Body, *and yet without all* Biting, Sharpenesse, *or* Fretting; *Insomuch as some of them, put vpon the* Back *of your* Hand, *will, with a little stay, passe through to the* Palme, *and yet taste* Milde *to the* Mouth. *Wee haue also* VVaters, *which we ripen in that fashion, as they become* Nourishing; *So that they are indeed excellent* Drinke; *And Many will vse no other.* Breads *we haue of seuerall* Graines, Roots, *and* Kernells; *Yea and some of* Flesh, *and* Fish, Dryed; *With diuerse kindes of* Leauenings, *and* Seasonings: *So that some doe extreamely moue* Appetites; *Some doe Nourish so, as diuerse doe liue of them, without any other* Meate; *Who liue very long. So for* Meates, *wee haue some of them so* beaten, *and made* tender, *and* mortified, *yet without all* Corrupting, *as a* VVeake Heate *of the* Stomach *will turne them into good* Chylus; *As well as a* Strong Heate *would* Meate *otherwise prepared. We haue*

ſome Meates *alſo, and* Breads, *and* Drinks, *which taken by Men, enable them to* Faſt *long after; And ſome other, that vſed make the very* Fleſh *of* Mens Bodies, *ſenſibly, more* Hard *and* Tough; *And their* Strength *farre greater, then otherwiſe it would bee.*

Wee haue Diſpenſatories, *or* Shops *of* Medicines. *Wherin you may eaſely thinke, if we haue ſuch* Variety *of* Plants, *and* Liuing Creatures, *more then you haue in* Europe, (*for we know what you haue,*) *the* Simples, Druggs, *and* Ingredients *of* Medicines, *muſt likewiſe be in ſo much the greater* Variety. *Wee haue them likewiſe of diuerſe* Ages, *and long* Fermentations. *And for their* Preparations, *wee haue not onely all Manner of Exquiſite* Diſtillations, *and* Separations, *and eſpecially by* Gentle Heates, *and* Percolations *through diuerſe* Strainers, *yea and* Subſtances; *But alſo exact* Formes *of* Compoſition, *wherby they incorporate allmoſt, as they were* Naturall Simples.

Wee haue alſo diuerſe Mechanicall Arts, *which you haue not; And* Stuffes *made by them; As* Papers, Linnen, Silks, Tiſſues; *dainty* VVorks *of* Feathers *of wonderfull Luſtre; excellent* Dies, *and many others: And* Shops *likewiſe, as well for ſuch as are not brought into Vulgar vſe amongſt vs, as for thoſe that are. For you muſt know, that of the Things before recited, many of them are growne into vſe throughout the Kingdome; But*

yet,

yet, if they did flow from our Inuention, *wee haue of them also for* Patternes *and* Principalls.

Wee haue also Fournaces *of great* Diuersities, *and that keepe great* Diuersitie *of* Heates: Fierce *and* Quicke; Strong *and* Constant; Soft *and* Milde; Blowne, Quiet, Dry, *Moist*; *And the like. But aboue all we haue* Heates, *in Imitation of the* Sunnes *and* Heauenly Bodies Heates, *that passe diuerse* Inequalities, *and (as it were)* Orbs, Progresses, *and* Returnes, *wherby we produce admirable effects. Besides wee haue* Heates *of* Dungs; *and of* Bellies *and* Mawes *of* Liuing Creatures, *and of their* Blouds, *and* Bodies; *and of* Hayes *and* Herbs *layd vp moist*; *of* Lime *vnquenched*; *and such like.* Instruments *also which generate* Heate *onely by* Motion. *And further,* Places *for Strong* Insolations; *And againe* Places *vnder the* Earth, *which by* Nature, *or* Art, *yeeld* Heate. *These diuerse* Heates *wee vse, As the* Nature *of the* Operation, *which wee intend, requireth.*

Wee haue also Perspectiue-Houses, *wher wee make* Demonstrations *of all* Lights, *and* Radiations: *And of all* Colours: *And out of* Things vncoloured *and* Transparent, *wee can represent vnto you all seuerall* Colours; *Not in* Raine-Bowes, *(as it is in* Gemms, *and* Prismes,) *but of themselues Single. Wee represent also all* Multiplications *of* Light, *which wee carry to great* Distance, *and make so* Sharp, *as to discerne small*

Points *and* Lines. *Also all* Colourations *of* Light; *All* Delusions *and* Deceits *of the* Sight, *in* Figures, Magnitudes, Motions, Colours: *All* Demonstrations *of* Shadowes. *Wee finde also diuerse Meanes yet vnknowne to you, of* Producing *of* Light, *originally, from diuerse* Bodies. *Wee procure meanes of Seeing* Obiects a-farr off; *As in the* Heauen, *and* Remote Places: *And represent* Things Neare *as* A-farr off; *And* Things A-farr off *as* Neare; *Making* Faigned Distances. *Wee haue also* Helps *for the* Sight, *farr aboue* Spectacles *and* Glasses *in vse. Wee haue also* Glasses *and* Meanes, *to see* Small *and* Minute Bodies, *perfectly and distinctly; As the* Shapes *and* Colours *of* Small Flies *and* Wormes, Graines *and* Flawes *in* Gemmes *which cannot otherwise be seen,* Obseruations *in* Vrine *&* Bloud *not otherwise to be seen. Wee make* Artificiall Raine-Bowes, Halo's, *and* Circles *about* Light. *Wee represent also all manner of* Reflexions, Refractions, *and* Multiplications *of* Visuall Beames *of* Obiects.

Wee haue also Pretious Stones *of all kindes, many of them of great Beauty, and to you vnknowne:* Crystalls *likewise; And* Glasses *of diuerse kindes; And amongst them some of* Mettals Vitrificated, *and other* Materialls, *besides those of which you make* Glasse. *Also a Number of* Fossiles, *and* Imperfect Mineralls, *which you haue not. Likewise* Loadstones *of Prodigious Vertue: And other rare* Stones, *both* Naturall, *and* Artificiall.

Wee

Wee haue also Sound-Houses, *wherewee practise and demonstrate all* Sounds, *and their* Generation. *Wee haue* Harmonies *which you haue not, of* Quarter-Sounds, *and lesser* Slides *of* Sounds. *Diuerse* Instruments *of* Musick *likewise to you vnknowne, some* sweeter *then any you haue; Together with* Bells *and* Rings *that are dainty and sweet. Wee represent* Small Sounds *as* Great *and* Deepe; *Likewise* Great Sounds, Extenuate *and* Sharpe; *Wee make diuerse* Tremblings *and* Warblings *of* Sounds, *which in their* Originall *are* Entire. *Wee represent and imitate all* Articulate Sounds *and* Letters, *and the* Voices *and* Notes of Beasts *and* Birds. *Wee haue certaine* Helps, *which sett to the* Eare *doe further the* Hearing *greatly. Wee haue also diuerse* Strange *and* Artificiall Eccho's, Reflecting *the* Voice *many times, and as it were* Tossing *it: And some that giue back the* Voice Lowder *then it came, some* Shriller, *and some* Deeper; *Yea some rendring the* Voice, Differing *in the* Letters *or* Articulate Sound, *from that they receyue. Wee haue also meanes to conuey* Sounds *in* Trunks *and* Pipes, *in strange* Lines, *and* Distances.

Wee haue also Perfume-Houses; *wherewith we ioyne also* Practises *of* Tast. *VVee* Multiply Smells, *which may seeme strange. VVee* Imitate Smells, *making all* Smells *to breath out of other* Mixtures *then those that giue them. VVee make diuerse* Imitations *of* Tast *likewise, so that they*

will deceyue any Mans Taſt. *And in this* Houſe *wee containe alſo a* Confiture-Houſe, *wher wee make all* Sweet-Meats, Dry *and* Moiſt; *And diuerſe pleaſant* Wines, Milks, Broaths, *and* Sallets, *farr in greater variety, then you haue.*

Wee haue alſo Engine-Houſes, *wher are prepared* Engines *and* Inſtruments *for all Sorts of* Motions. *Ther we imitate and practiſe to make* Swifter Motions, *then any you haue, either out of your* Musketts, *or any* Engine *that you haue :* And *to* Make *them*, *and* Multiply *them more* Eaſily, *and with* Small Force, *by* VVheeles, *and other* Meanes : *And to make them* Stronger, *and more* Violent, *then yours are; Exceeding your greateſt* Cannons, *and* Baſilisks. *Wee repreſent alſo* Ordnance *and* Inſtruments *of* VVarr, *and* Engines *of all Kindes : And likewiſe New* Mixtures *and* Compoſitions *of* Gun-Powder, Wilde-Fires *burning in* Water, *and* Vnquenchable. *Alſo* Fire-workes *of all* Variety, *both for* Pleaſure, *and* Vſe. *Wee imitate alſo* Flights *of* Birds; *Wee haue ſome* Degrees *of* Flying *in the* Ayre. *Wee haue* Shipps *and* Boates *for* Going vnder Water, *and* Brooking of Seas; *Alſo* Swimming-Girdles *and* Supporters. *Wee haue diuers curious* Clocks; *And other like* Motions *of* Returne : *And ſome* Perpetuall Motions. *Wee imitate alſo* Motions *of* Liuing Creatures, *by* Images, *of* Men, Beaſts, Birds, Fiſhes, *and* Serpents. *Wee haue alſo a great*

great Number of other Various Motions, *strange for* Equality, Fineneſſe, *and* Subtilty.

Wee haue alſo a Mathematicall Houſe, *wher are repreſented all* Inſtruments, *as well of* Geometry, *as* Aſtronomy, *exquiſitely made.*

Wee haue alſo Houſes of Deceits of the Senſes; *wher we repreſent all manner of* Feates *of* Iugling, Falſe Apparitions, Impoſtures, *and* Illuſions; *And their* Fallaces. *And ſurely you will eaſily beleeue, that wee, that haue ſo many* Things *truely* Naturall, *which induce* Admiration, *could in a* World *of* Particulars deceiue *the* Senſes, *if wee would diſguiſe thoſe* Things, *and labour to make them ſeeme more* Miraculous. *But wee doe hate all* Impoſtures, *and* Lies: *Inſomuch as wee haue ſeuerely forbidden it to all our* Fellowes, *vnder paine of Ignominy and Fines, that they doe not ſhew any* Naturall worke *or Thing,* Adorned *or* Swelling; *but onely* Pure *as it is, and without all* Affectation *of* Strangeneſſe.

Theſe are (my Sonne) the Riches of Salomons Houſe.

For the ſeuerall Employments *and* Offices *of our* Fellowes; *Wee haue Twelue that Sayle into* Forraine Countries, *vnder the* Names *of other* Nations, *(for our owne wee conceale;) Who bring vs the* Bookes, *and* Abſtracts, *and* Patternes *of* Experiments *of all other* Parts.

Theſe

These wee call Merchants *of* Light.

Wee haue Three that Collect *the* Experiments *which are in all* Bookes. *These wee call* Depredatours.

Wee haue Three that Collect *the* Experiments *of all* Mechanicall Arts; *And also of* Liberall Sciences; *And also of* Practises *which are not* Brought into Arts. *These we call* Mystery-Men.

Wee haue Three that try New Experiments, *such as themselues thinke good. These wee call* Pioners *or* Miners.

Wee haue Three that Drawe *the* Experiments *of the* Former Foure *into* Titles, *and* Tables, *to giue the better light, for the drawing of* Obseruations *and* Axiomes *out of them. These wee call* Compilers.

Wee haue Three that bend themselues, Looking *into the* Experiments *of their* Fellowes, *and cast about how to draw out of them* Things *of* Vse, *and* Practise *for* Mans life, *and* Knowledge, *as well for* VVorkes, *as for* Plaine Demonstration *of* Causes, Meanes *of* Naturall Diuinations, *and the easie and cleare* Discouery, *of the* Vertues *and* Parts *of* Bodies. *These wee call* Dowry-men *or* Benefactours.

Then after diuerse Meetings *and* Consults *of our whole* Number, *to consider of the former* Labours *and* Collections, *wee haue Three that take care, out of them, to* Direct New Experiments, *of a*

Higher

Higher Light, *more* Penetrating *into* Nature *then the* Former. *These wee call* Lamps.

Wee haue Three others that doe Execute *the* Experiments *so* Directed, *and* Report *them*. *These wee call* Inoculatours.

Lastly, wee haue Three that raise the former Discoueries *by* Experiments, *into* Greater Obseruations, Axiomes, *and* Aphorismes. *These wee call* Interpreters *of* Nature.

Wee haue also, as you must thinke, Nouices *and* Apprentices, *that the Succession of the former Employed Men doe not faile; Besides, a great Number of* Seruants *and* Attendants, Men *and* Women. *And this we doe also: We haue* Consultations, *which of the* Inuentions *and* Experiences, *which wee haue discouered, shall be Published, and which not: And take all an* Oath *of* Secrecy, *for the Concealing of those which wee thinke fitt to keepe Secrett: Though some of those we doe reueale sometimes to the* State, *and some not.*

For our Ordinances *and* Rites: *Wee haue two very* Long, *and* Faire Galleries: *In one of these wee place* Patternes *and* Samples *of all manner of the more* Rare *and* Excellent Inuentions: *In the other wee place the* Statua's *of all* Principall Inuentours. *There wee haue the* Statua *of your* Columbus, *that discouered the*

West-Indies: *Also the* Inuentour *of* Shipps: *Your* Monke *that was the* Inuentour *of* Ordnance, *and of* Gunpowder: *The* Inuentour *of* Musicke: *The* Inuentour *of* Letters: *The* Inuentour *of* Printing: *The* Inuentour *of* Obseruations *of* Astronomy: *The* Inuentour *of* Works *in* Mettall: *The* Inuentour *of* Glasse: *The* Inuentour *of* Silke *of the* VVorme: *The* Inuentour *of* VVine: *The* Inuentour *of* Corne *and* Bread: *The* Inuentour *of* Sugars: *And all these, by more certaine Tradition, then you haue. Then haue we diuerse* Inuentours *of our* Owne, *of* Excellent VVorkes; *Which since you haue not seene, it were too long to make* Descriptions *of them; And besides, in the right Vnderstanding of those* Descriptions, *you might easily erre. For vpon euery* Inuention *of Valew, wee erect a* Statua *to the* Inuentour, *and giue him a Liberall and Honourable* Reward. *These* Statua's *are, some of* Brasse; *some of* Marble *and* Touchstone; *some of* Cedar *and other speciall* VVoods *guilt and adorned; some of* Iron; *some of* Siluer; *some of* Gold.

Wee haue certaine Hymnes *and* Seruices, *which wee say dayly, of* Laud *and* Thanks *to* God, *for his Marueillous* VVorks: *And* Formes *of* Prayers, *imploring his* Aide *and* Blessing, *for the* Illumination *of our* Labours, *and the* Turning *of them into* Good *and* Holy Vses.

Lastly, wee haue Circuites *or* Visits, *of diuers*

Principall

Principall Citties *of the* Kingdome; *wher, as it commeth to passe, we doe publish such New* Profitable Inuentions, *as wee thinke good. And wee doe also declare* Naturall Diuinations *of* Diseases, Plagues, Swarmes *of* Hurtfull Creatures, Scarcety, Tempests, Earthquakes, Great Inundations, Cometts, Temperature *of the* Yeare, *and diuerse other Things; And wee giue* Counsell *thereupon, what the* People *shall doe, for the* Preuention *and* Remedy *of them.*

And when Hee had sayd this, Hee stood vp: And I, as I had beene taught, kneeled downe, and He layd his Right Hand vpon my Head, and said; GOD *blesse thee, my Sonne; And* GOD *blesse this Relation, which I haue made. I giue thee leaue to Publish it, for the Good of other Nations; For wee here are in* GODS *Bosome, a Land vnknowne.* And so hee left mee; Hauing assigned a Valew of about two Thousand Duckets, for a Bounty to mee and my Fellowes. For they giue great Largesses, where they come, vpon all occasions.

The rest was not Perfected.

MAGNALIA NATVRÆ, PRÆCIPVE QVOAD *VSVS HVMANOS.*

The Prolongation *of* Life.
The Restitution *of* Youth *in some* Degree.
The Retardation *of* Age.
The Curing *of* Diseases *counted* Incurable.
The Mitigation *of* Paine.
More Easie *and lesse* Loathsome Purgings.
The Encreasing *of* Strength *and* Actiuity.
The Encreasing *of* Ability *to suffer* Torture *or* Paine.
The Altering *of* Complexions : *And* Fatnesse, *and* Leannesse.
The Altering *of* Statures.
The Altering *of* Features.
The Encreasing *and* Exalting *of the* Intellectuall Parts.
Versions *of* Bodies *into other* Bodies.
Making *of* New Species.
Transplanting *of one* Species *into another.*
Instruments *of* Destruction, *as of* VVarre, *and* Poyson.

Exhilaration *of the* Spirits; *and* Putting *them in good* Disposition.

Force *of the* Imagination, *either vpon another* Body, *or vpon the* Body *it selfe.*

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* Aire, *and* Raising *of* Tempests.

Great Alteration; *As in* Induration, Emollition, &c.

Turning Crude *and* Watry Substances *into* Oyly *and* Vnctious Substances.

Drawing of New Foodes *out of* Substances *not now in* Vse.

Making New Threds *for* Apparell; *And* New Stuffes; *Such as are* Paper, Glasse, &c.

Naturall Diuinations.

Deceptions *of the* Senses.

Greater Pleasures *of the* Senses.

Artificiall Mineralls *and* Cements.

FINIS.

In the *New Atlantis* Pag. 28. lin. 27. for *both* read *bath.* Pag. 36. lin. 6. for *procuced* read *produced.*