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Robert Wilson

SYLVA SYLVARVM
or
A NATVRALL HISTORY
In ten Centuries.

Written by the right Honble Francis Lo: Verulam Viscount Sct Alban.

Published after ye Authors Death

by W: RAWLEY Dr 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.

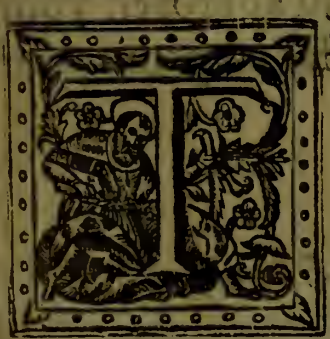
Anno 1627

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:

OR

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.

HAuing 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 *Nouum Organum* (of which his Lordſhip is yet to publiſh a Second

a Second Part,) ſet downe the Inſtruments and Directions for the VVorke; 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.

1

DIGG a *Pitt* vpon the *Seashore*, 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 *Seashoare*, 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*; becaus the Pitt filleth according to the Measure of the *Tide*: And the *Sea water* passing or Strayning through the Sandes, leaueth the Saltnesse.

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

2

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* ſlideth 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, *Cornish 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

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, Mettall, &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. Experiments in Conſort touching *Motion* of *Bodies* vpon their *Preſſure*. 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*, whereinto 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 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.

14

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 *VVater* in the Neck of the *Glasse*; It is that, which setteth the *Motion* on worke: For *VVater* and *VVine* 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 therfore 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 *VVater 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 disipate, 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 *Phisicians*, 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* oftner: Take *Violetts*, and infuse a good Pugill of them in a Quart of Vineger; Lett them stay three quarters of an houre, and take 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 suliginous 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 *Medecine* 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 *Bvbbles* 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 Rockes 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, (whereof 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 easelliest 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 Railing 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*; wheras 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 Necessity, 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 th abroad 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 *Grauity* 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 bruised*, *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*, *Pelletory 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* looſeneth 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.

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

Wee haue ſpoken of *Euacuating* of the *Body*; wee will now ſpeake ſomething of the *Filling* of it by *Reſtoratiues* in *Conſumptions*, and *Emaciating Diſeaſes*. In *Vegetables*, there is one Part that is more Nouriſhing than another; As *Graines*, and *Roots* nouriſh more, than the *Leaues*; In ſo much as the *Order* of the *Foliatanes* 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.

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 off 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 Bo-

dy,

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 *Bloud* 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 weakues 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 changed; 55

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 Beeſe; 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 Manibuſq; Manus, 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 wooll*, 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 therfore draweth the Humour out; and doth not draw more to it; For it

Experiment Solitary touching *Filum Medicinale*. 60

is a *Gentle Fomentation*, and hath withall a Mixture, (though very little) of ſome *Stupefactiue*. 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 ſometimes 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 proue 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 Ex-

pell

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 minùs*, 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 Broaths*; *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 *ſetling* 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 *Oriſice* 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 *Sacietie*, 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 ſort 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*.

69 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 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*.

70 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 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*.

71 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 *Cold*; Except 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*.

72 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 longer in *Heating* than *Softer 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.

73 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 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-ſilver* 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 leaue 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-siluer*: 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 *Caue* 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, 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 Syluarum*, 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 *Fineneſſe 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*; wheras 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*, rarified 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 *Sapientiâ 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 Heating 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, whereby 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 chiefe; 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.

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 leaſe, 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*.

Experiment Solitary, touching the *Impoſſibility of Annihilation*.

100

NATV-

NATVRALL HISTORIE.

II. Century.

MVSICKE 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*.

101 All *Sounds*, are either *Musicall Sounds*, which we call *Tones*; Whereunto 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 *Vnequall*; 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.

102 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*;

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*.

107 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.

108 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*.

109 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*.

110 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. Neuertheleſſe 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.

111 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*.

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 *Prater Expectatum*; For there is a Pleaſure euen in *Being deceiued*. The *Reports*, and *Fuges*, 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*, *Dolefull 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 *Tunes* 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*.

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

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.

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 ſtraitned, 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 Motion, 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*,)

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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 small, 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*.

121 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*.

122 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*.

123 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 *Bay-leaues*, 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.

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 *Dividing*, 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 *Production*, *Conseruation*, and *Delation of Sounds*; And

the *Office* of the *Aire* therein.

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: wheras, 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 *Softer*, 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.

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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 paralleleth 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.

Neuertheleſſe it is true, that vpon the *Noiſe* of *Thunder*, and great *Ordnance*; Glaſſe windowes will ſhake; and Fiſhes are thought to be frayed 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 *ſpirituall 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 preſerueth 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 Truncke, 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; Wheras 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 Closeness 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 fiue wayes (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*

Truncke 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 confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two Trunckes (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 confounded; amplified; or dulled. Which two *Instances* will also giue light to the *Mixture* of *Sounds*; whereof 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 *Softnesse* 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 *Softnesse* 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 *Softnesse* 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, 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. 164

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 *Riſt* 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 Grateſull, 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 *Species*, it is *True*; But if it giueth a treble, or more, it is *False*.

172 *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.

173 All *Base Notes*, or very *Treble Notes*, giue an Asper *Sound*; For that the *Base* striketh more Aire, than it can well stroke 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.

174 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 Weasill 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.

175 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.

176 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.

177 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*.

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

178 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*.

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 Induſtry 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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Experiments in Consort touching the *Proportion* of *Treble* and *Base Tones*.

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 diſcouereth 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.

184 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.

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

186 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*.

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 ſofter, 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 *Articulate*

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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 materiall 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 Roofe, 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 *Aſpiratæ*; 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*, *Pallate*, 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 neuertheless 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 becaus the *Sound* Passeth thorow the *Wall*; but *Archeth* ouer the *Wall*.

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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.

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Sounds, though they *spread round*, (so that there is an *Orbe*, or *Spericall 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.

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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 *Truncke*: 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 Cõſort touching the *Laſting* and *Periſhing* of *Sounds*; and touching the *Times* they require to their *Generation*, or *Delation*.

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 wonderfull 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.

209 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*.

210 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.

211 *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.

Experiments in Consort, touching the *Passage* and *Interceptions* of *Sounds*.

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.

212 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.

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; 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 vnequall 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.*

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

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.

221

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.

222

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* yeeldeth an excellent *Sound*, not inferiour to that of *Siluer*, or *Braſſe*, but rather better: yet wee ſee that a

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 neuertheleſſe, 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 Conflation 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 *Darkenesse* 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 Originall *Sound*, or the *Reflexion*, be cleane and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, 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 *Eccho's*. Experiments in Consort touching *Melioration* 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 *Violl* 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; Wheras 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 *melioirateth* 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 Hornes* 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 Attire, *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 being 243

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 *Originall*, 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. Neuertheleſſe 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 *Originall 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 *Originall 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 giue 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' en*; 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 chop againe, 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*, appeareth 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 Scarfe, 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 neuertheleſſe 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 nearer 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 *Object* 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* fillipped; 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.

278 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* 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 report *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; And therefore, rather driueth away the voice, than draweth it: And 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.* 283 284

Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceiue it likely 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. 285

If the *Mouth* be ſhut cloſe, neuertheleſſe there is yeelded by the Roofe of the Mouth, a Murmur. 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.* 286

The *Repercuſſion* of *Sounds*, (which we call *Eccho*,) is a great Argument 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 Matter in the Returning of them; But onely a plaine Stop, and *Repercuſſion.* Experiments in Conſort touching the *Spirituall* and *Fine Nature* of *Sounds.* 287

The Exquiſite *Differences* of *Articulate Sounds*, carried along in the *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. 288

All *Sounds* are ſuddenly made, and doe ſuddenly periſh; But neither that, nor the *Exquiſite Differences* of them, is Matter of ſo great Admiration: For the Quauerings, and Warblings in Lutes, and Pipes, 289

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 tou-

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*.

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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* doth that 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, Bisket, 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 Inuitation; 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 Excerne 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 therfore 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 Reliſh 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*.

NATV-

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 *Herbs* 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 ſerueth. 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 leiune, 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 Sweat, 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 Yellowness, and Sweetness. The *Cause* is, for that that *Degree of Heat* which is in *Lime*, and *Ashes*, (being a Smothering *Heat*) is of all the rest most Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the 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 citius 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 *Wooll*, *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 (*vice 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 *Digest*, 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 digest 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 closeness 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 *Softneſſe*; *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 Seuerall *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 *Diſgeſtion*, 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 *Deſiccation*, *Induration*, *Conſumption*, &c. As in *Bricke*, Euaporation of *Bodies Liquid*, &c.

The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; Firſt by *Adding ſome Crude or Watry Moiſture*; As in Wetting of any Fleſh, Fruit, Wood, with *Water*, &c. For contrariwiſe *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 perflabilis*) 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 *Bloud*, 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

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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 *Deſiccation*; 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*.

341 The Firſt *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: 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*.

342 The Second is *Aſtriction*: For *Aſtriction* prohibiteth *Diſſolution*: As 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.

343 The Third is, the Excluding of the *Aire*; And againe, the *Expoſing 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*.

344 The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Reſt*; For the Subtill *Motion*, which *Putrefaction* requireth, is diſturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As we ſee that Turning 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 feele 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 aline*, 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*. 352

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*. 354

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 young, 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 Quickenesse 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 ſpotted 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 all 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

monly againſt the Rayes of the Sunne. They haue a fooliſh Tradition in *Magicke*, that if a *Chameleon* 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.

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 neuertheleſſe is ſufficient to Enflame the *Oyle*.

Experiment Solitary, touching *Subterrany Fires*. 361

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 *Nitre*. 362

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 *Aire*. 363

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

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

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 *Preſeruing* 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 Tarras, 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*.

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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.

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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.

368 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.

369 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 *Wicke* 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 Wicke 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 *Wicke* 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.

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

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. *Quære*, whether *Wood*, and *Wickes* both, as in *Torches*, conſume faſter, than the *Wickes Simple?*

371 We haue ſpoken of the Seuerall *Materialls*, and the Seuerall *Wickes*: But to the *laſting* of the *Flame*, it importeth alſo; Not only what the *Materiall* is, but in the ſame *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Houſewiues*, 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 Wicke in the Middeſt; whereby it commeth to paſſe, that the Wicke 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 Wicke 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*.

Experiments in Consort touching *Burialls* or *Infusions* of diuers *Bodies* in *Earth*.

376

Burialls 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.

377

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.

378

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.

379

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*.

380

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,

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 Reſplendent.

Experiment Solitary, touching the *Affection* in *Mens Bodies* from *Seuerall 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 *Errour* 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 *Liquours* 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* ſowred, and began to Putrifie. Neuertheleſſe 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

Diuers, 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.

388

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.

389

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

391 may account the Better.

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

393 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.

394 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the ſame *Quantity* of *Mault*; 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*.

395 Fifthly, The Houſwiues 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*.

396 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 putrifie ſooneſt; which is likely, becauſe of the Fineneſſe of the Spirit: And in *Conſeruatories*

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 Appetite 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 ſeuered; 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 *Prosperity*, 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 *Nouember*: 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 *July*; 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 Nouriſhment, 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*, *Muske-Roſes*, &c.

427 From *May* to *July* 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 *Alhollontide* 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.

428 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.

429 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.

430 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.

431 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.

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

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 Verjuyce. 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 *Graſiers* 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 deliuereth 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 neuertheleſſe 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 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 Bigneſſe, and before it ripeneth, hath beene practiſed with ſucceſſe, to ripen the Fruit more ſuddenly. Wee ſee the Example of the *Biting* of *Waſpes*, 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 Nourishment 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. Neuertheless 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 nourishment; 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 Nourishment 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 *Salt*, 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 *Chaffe*, 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 Bloud*; 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*.

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465 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 *Pigges* Fleſh is the Moiſteſt of Fleſhes.

466 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.

467 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*.

468 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*.

469 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.

470 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*.

471 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

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; Whereſoeuer 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 *Common 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, leauing 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*, (wherof 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 Leafe, 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 *Wooll*, 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 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 Mouldworkes 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. *Quære* 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 *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 Lillies*.

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 *Harueft 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 *Co-* 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 whatsoeuer 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 already

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*.

526 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*.

527 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*.

528 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 *Maioram*, 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*.

529 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 *Muſh-*

romes,

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 *Camomill*, 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 *Proceritie*, 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 Plants, and the Generation of Plants and 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 *Confrication* of the *Horne* vpon the *Iuy*, 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 digest, 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 digest. 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 Que- 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 *Haſles*; 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 *Velues 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 Courser, 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*, *Housleeke*, *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 *Clefts*; 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*.

574 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 *Roots*, *Barkes*, and *Seeds*, contuſed together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other.

575 *Plants* brought out of *Hot Countries*, will 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* translated 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.

576 Many *Plants*, which grow in the *Hotter Countries*; being set in the *Colder*, will neuertheless, 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.

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

577 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*, *Raspes*; 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.

578 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.

579 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

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

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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 euery *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*. 588

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 ſpred 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

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 *Parles*.

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 Spiry, 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*.

593 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.

594 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.

Experiments in Conſort touching all Manner of *Compoſts*, and *Helps* of *Ground*.

595 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 *Grazing 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.

596 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;

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*: wherin *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 *Enclo-ſures*, 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 *Riuer*. 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 *Drayninges* 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 *Vitrioll*, 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 fall 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 Philosophical'y; *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-Piony*, *Female-Piony*; *Male-Rose-mary*, *Female-Rose-mary*; *Hee-Holly*, *Shee-Holly*; &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The neareſt Approach of it, is between the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow 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 Faigned, 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 *Participles* 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 Promiscuous 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 ouerloaden, 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 neuertheless is of a pleasant Taste. And that (no doubt) is caused, by the *Suppleness* and *Gentleness* 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*: *Quare*, 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 neuertheleſſe 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. *Quære* 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*,

ment, 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*, *Orenges*, *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, if 635

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*.

640 *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.

641 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.

642 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. *Quære* of the *Mosses* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloës*, &c.

643 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.

644 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*.

645 There bee few *Herbes* that haue a *Salt Taste*; And contrariwise all *Bloud* 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

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 *Semper-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 appeareth 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 shou'd 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 *Pu-* 652
trified, 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 *Bloud*, 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 rift 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.

659 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.

660 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.

661 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*.

662 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*.

663 *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*.

664 *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

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 *Poorenеſſe* of the *Herbs*, (it is plaine,) ſhew the *Poorenеſſe* 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 *Graſting*: 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 Weald*. 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 *Honſleeke*, doth good. Though *Graine*, that toucheth 670

toucheth *Oyle*, or *Fat*, receiueth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to Putrifie, (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 *Cinquefoile*. 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*; Whereas 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 *Pomegranate* 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 *Buffles*; *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 *Manisses*; *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 *Clearneſſe* 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 *Prognoſticks* 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 Vndermine 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 *Trochischs* 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 *Agaricke*, 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 *Ancients*, 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 Looseneese 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 *Scaliger* 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 *Senses* that we know not: And the very *Sent* of *Dogs* is almost a *Sense* by it selfe. 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. Furthermore, 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. *Quære* 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 vntrue: 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,) ſtrengthneth 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. *Quære*, 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-Armenicke* 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 *Sudorificke 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 Strife 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.

715 *Ioy* causeth a *Chearefulnesse*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Teares*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *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 *Griefe*. But then in *Ioy*, it worketh it diuersly; *viz.* by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupy more Roome.

716 *Anger* causeth *Paleneſſe* in some, and the *Going* and *Comming of the Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *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*.

717 *Light Displeasure* or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same *Causes* that *Trembling*, and *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 *Obiect* 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 *Obiect* 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* euen 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 *Obiect* 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

Generall 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* inebriateth leſſe, than *Wine Pure*. The *Cauſe* of the Former is, for that the *Wine* deſcendeth not ſo faſt to the *Bottome* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and ſendeth *Vapours* faſter to the *Head*; And therefore inebriateth 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*.

727 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*.

Experiment Solitary, touching *Catterpillers*.

728 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 ouer.

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 *Crayfish*, 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 *Tendernesse* and *Softnesse* of

of the *New Shell*; And somewhat by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should 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 Fleshy; 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 *Prognosticks* 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 euen 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 *Releeue* 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 only paint Themselues, but they pounce 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's 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) furthereth *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. *Quære*, 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

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*.

Experiments in Conſort, touching *Teeth* and *Hard Subſtances* in the *Bodies* of *Liuing Creatures*.

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 *Naile*.

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 *Rooſes* 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 *Preseruing* 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 Commateriall with *Teeth*. *Quare* 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 *Triall* 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 *Branched*; 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 *Living 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 *Living 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 *Diuer* 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 *Obiect* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Obiect* 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 *Gravity*, 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 *Gravity continued*, a *Compression* in them, as well downwards, as they haue when they are throwne, or Shot thorow the *Aire*, forwards. 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 *Noſthrills*, 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 neuertheleſſe 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 *Gummes*; 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; That

Experiment Solitary touching *Prohibition* of *Putrefaction*, and the *Long Conseruation* of *Bodies*.

771

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 *Feat*, 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 *Confitures*, 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

Experiment Solitary touching *Increa-*

giue

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 *Diſcourſe* 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 *Ætna*, 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 *Materialls* 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 harden 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 *Iudgement* of the *Cure* in ſome *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*.

Expetiment 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. *Galilæus* 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 Windowes 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 *Obiect* 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 *Preseruation* 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 *Freshnesse* 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*.

Experiment Solitary touching *Fixation* of *Bodies*. 799

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 Coaceruation* 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*, whereof *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 Liqueſiable*; The Laſt not.

Experiment Solitary, touching the *Reſtleſſe Nature* of Things in *Themſelues*, and their *Deſire* to *change*. 800

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

which seemeth by the *Weight*, to be the Closest, and most Solide *Body*, doth greedily drinke in *Quick-Silver*. 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 conceale, 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

803 *Great Droughts* in *Summer*, lasting till towards the *End* of *August*, and 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 *Sickenesse*: 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*.

804 The *Lesser Infections*, of the *Small Pockes*, *Purple Feuers*, *Agues*, in 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.

805 It were good to lay a *Peece* of *Raw Flesh*, or *Fish*, in the *Open Aire*; And if it Putrefie quickly, it is a *Signe* of a *Disposition* in the *Aire* to *Putrefaction*. And because you cannot be informed, whether the *Putrefaction* be 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*.

806 Take *May-Dew*, and see whether it putrifie quickly, or no? For that likewise may disclose the *Qualitie* of the *Aire*, and *Vapour* of the *Earth*, more or lesse *Corrupted*.

807 A *Drie March*, and a *Drie May*, portend a *Wholesome Summer*, if there be a *Showring April* betweene: But otherwise, it is a *Signe* of a *Pestilentiall Yeare*.

808 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 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 *Drought* extend farre into *September*, portendeth an Open Beginning of *Winter*; And *Colds* to ſucceed, toward the latter Part of the *Winter*, and
808 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 *Shoare*; 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

827 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.

828 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*.

829 *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*.

830 *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 beateth backe the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

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 *Glassy 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 *Rainbow*.

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 *Gloueration* 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*. Neuertheleſſe, 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 *Solicitation* 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*,

brous, 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*: Neuertheleſſe 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 *Straitly 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 *Sticke* 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 ſtirthereth 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 severall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Native 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 *Native 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 *Native Spirit* is more *Yeelding*, and *Extensiue*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great Diuersitie; As *Hot*, *Cold*, *Active*, *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 *Ieiunenesse* 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 roape. 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 *Differences* 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 *Continuitie*, 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 *Coacernate*, 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 *Diſgeſtion*, 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 *Wooſe*, 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. *Quære* 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 count *Baſe*; As whether *Iron*, *Braſſe*, and *Tinne*, be refined to the Heighth? But when they come to ſuch a Fineneſſe, as ſerueth 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 faireſt *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 *Viuifie*, and not Nourish.

Experiment Solitary, touching the *Comparatiue Magnitude* of *Liuing 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 *Viuification* 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* herewith 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 *Sweet* 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 *Soureneſſe* 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 *Fleſhes*, 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 *Carnivora*, 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* fondly (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 *Soureneſſe*.

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 *Fineneſſe* 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* dispersseth 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*; wheras 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 *Actiuitie*. 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 *Insecta*; 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. Neuertheless it is certaine, that *Oisters*, and *Cockles*, and *Muscles*, 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-Muscle*, 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 digest 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 Obiect 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 *Obiects* 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 *Attraction* 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

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 Claſpe the *Bottome* of the *Baſen*. That *Experiment*, when the *Baſen* was lifted vp, was made with *Oyle*, and not with *Water*: Neuertheleſſe 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 *Verjuyce* 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 (neuertheless) 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 *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Yeelding*, 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*.

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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*, nor *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 Bottomleſſe *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*;

Neſcio 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 *Actiue*, 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 Buſineſſe*,) 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 Prooſes, 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 neuertheleſſe 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.

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907 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*.

908 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*.

909 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*.

910 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*.

911 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 *Individuals*: For as

there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things*, that 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 *Vapour*, or *Exhalation*, *Odour-like*.

912 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 *Luſhious*, are ill for the *Plague*; As *White Lillies*, *Cowſlips*, and *Hyacinths*.

913 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 *Bloud*, more than to a *Stranger*.

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 Buſineſſe, 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 *Arraignments*; 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 *Country* 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

ported to be in *Perfumed Gloues*, or the like: And it is like, they Mingle the *Poyson* that is deadly, with some *Smels* that are Sweet, which also maketh it the sooner receiued. *Plagues* also haue been raised by *Annointings* of the *Chinckes* of *Doores*, and the like; Not so much by the Touch, as 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 *Effectiue* 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 *Immateriate 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 *Loue*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Enuy*, that emitteth some *Maligne* 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 *Sickneſſe*; 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 *think 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 feed 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

euer

euer with *Imagination*; vpon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. What soeuer is of this kinde would be throughly enquired. *Trialls* 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 *Motions* 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 Motions*, than vpon *Motions 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

Experiments in Consort, touching the *Secret Vertue* of *Sympathy*, and *Antipathy*.

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*, aboue 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 *Tinctcd Lanthornes*, or 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 Aloës*, *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 *Trochiſh* 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 *Bloud-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*. *Quære*, if the *Stone* taken out of the *Toads Head*, be not of the like Vertue? For the *Toade* loueth *Shade*, and Coolneſſe. 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*, furthereth their *Action*. 968

The *Writers* of *Naturall Magick*, commend the Wearing of the *Spoile* of a *Snake*, for *Preſeruing* 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 *Aſhes* of a *Hedge-Hog* are ſaid to be a great *Deſiccatiue* 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*, *Leproufie*, to *Sound Fleſh*; And the *Excrement* of euery *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are leſſe Pernicious 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*, *Wiues*, &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 *Mindes*, and *Soules*, and *Spirits*.

Wee haue giuen formerly some *Rules* of *Imagination*; And touching the *Fortifying* 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 *Indiuidualls*, 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 *Cornes*, 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 farre 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 *Individuo*. 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 *Individuall 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, Grateſull & 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 TABLE OF the Experiments.

Century. I.

Century. II.

Century. III.

Century. IV.

of

Century. V.

Century. VI.

Century. VII.

Century. VIII.

Century. IX.

Century. X.

Of

FINIS.

Faults escaped in the Printing.

PAge 6. *line* 28. latter, *reade* later. *p.* 18. *l.* 10. Quilt, *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.*

NEVV
ATLANTIS.

A VVorke vnfinished.

VVritten by the Right Honourable, FRANCIS
Lord Verulam, Viſcount St. *Alban.*

NEVV 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.

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 Denial 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* SAVIOVR, *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 Piſtolletts, 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* GODS *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 Roofes 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 hoped 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 Citty 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 mooue 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 neuertheless 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 Natiues, 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 Houre 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, there 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 Auncеſtours 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 Acci-*

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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 establisshed. 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, froliſh 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 hee 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 Chineses 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 com-

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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 preheminence. 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 neuertheleſſe 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 Releefe, 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 set on the Topp; If the Females, then they are enamelled into a greenish yellow, with a Crescant 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 redd 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 Curtiſans, 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 Yeares 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 Freindships, 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, *where 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,) *where 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 Borders 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 *whereto 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 Incloſures 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. Wherin we finde many ſtrange Effects; As Continuing Life in them, though diuerſe Parts, which you acount Vitall, be periſhed, and taken forth; Reſuſsitating 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 Growth:

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* Silkwormes, *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* VVhite-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, *whereby 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, *where 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, *where wee 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* VVarblings *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; *wherwith 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 VVater, *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 ease 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*

VVeſt-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* VVorks *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 Underſtanding 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 Cities *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.*