SYLVA SYLVARVM
or
A NATURAL HISTORY
In ten Centuries.
Written by the right Honble Francis
Le Verrum 1st Count S. Alban.
Published after the Autho's Death.
by W. RAWLEY D'of Dium.
LONDON
Printed for Mr. Lee and are to be sold at the Great Park's Head next to the 24th of June next in each year.
SYLVA
SYLVARUM,
OR,
A Natural History,
IN TEN CENTURIES

Whereunto is newly added,
The History Natural and Experimental of LIFE and DEATH, or of the Prolongation of LIFE.

Published after the Authors Death.
By William Rawley, Doctor in Divinity,
One of His Majesties Chaplains.

Whereunto is added Articles of Enquiry, touching Metals and Minerals. And the New Atlantis. Also the LIFE of the Right Honorable Francis Bacon, never added to this Book before.

Written by the Right Honorable

FRANCIS
Lord Verulam, Viscount St. Alban.

The Ninth and Last Edition,
With an Alphabetical Table of the Principal Things contained in the Ten Centuries.

LONDON,
Printed by J. R. for William Lee, and are to be sold by George Sambrige, Francis Tjon, Thomas Williams, John Martin, Thomas Vere, Randolph Taylor, Henry Broom, Edward Thomas, Thomas Passenger, Nevil Symonds, Robert Clavel, William Crock, and James Magnes; and other Booksellers in London and Westminster. 1670.
TO THE
MOST HIGH AND MIGHTY
PRINCE CHARLES

By the Grace of God,
King of Great Britain, France, and Ireland,
Defender of the Faith, &c.

May it please Your Most Excellent Majesty.

The whole Body of the Natural History, either designed or written, by the late Lord Viscount S. Alban, was dedicated to Your Majesty, in his Book De Ventis, about Four years past, when Your Majesty was Prince: So as there needed no new Dedication of this Work, but only in all humility, to let Your Majesty know, it is Yours. It is true, if that Lord had lived, Your Majesty, ere long had been invoked to the Protection of another History, whereof, not Natures Kingdom, as in this: but these of

A 3

Your
Your Majesties, (during the time and Reign of King Henry the Eighth) had been the subject; which since, it died under the designation meerly: There is nothing left, but Your Majesties Princely goodness, graciously to accept of the undertakers Heart and Intentions; who was willing to have parted for a while with his darling Philosophy, that he might have attended Your Royal Commandment in that other Work. Thus much I have been bold, in all loveliness to represent unto Your Majesty, as one that was trusted with his Lordships Writings, even to the last. And as this Work affected the Stamp of Your Majesties Royal Protection, to make it more currant to the World; so under the protection of this Work, I presume in all humbleness to approach Your Majesties presence, and to offer it up into Your Sacred Hands.

Your Majesties most Loyal
and Devoted Servant

W. Rawley
TO THE READER.

Having had the Honor to be continually with my Lord, in compiling of this Work; and to be employed therein, I have thought it not amiss, (with his Lordships good leave and liking) for the better satisfaction of those that shall read it, to make known somewhat of his Lordships intentions, touching the ordering and publishing of the same. I have heard his Lordship often say; That if he should have served the glory of his own Name, he had been better not to have published this Natural History; for it may seem an indigested heap of Particulars, and cannot have that luster which Books cast into Methods, have: But that he resolved to prefer the good of Men, and that which might best secure it, before anything that might have relation to himself. And, he knew well, that there was no other way open to unloose Mens minds, being bound; and (as it were) Maleficiate, by the charms of deceiving Notions and Theories; and thereby made impotent for Generation of Works: But only nowhere to depart from the Sense and clear experience, but to keep close to it, especially in the beginning. Besides, this Natural History was a Debt of his, being designed and set down for a third Part of the Instauration. I have also heard his Lordship discourse, That Men (no doubt) will think many of the Experiments contained in this Collection, to be Vul-
gar and Trivial, mean and sordid, curious and fruitless; and therefore he wisheth, that they would have perpetually before their eyes, what is now in doing; and the difference between this Natural History, and others. For those Natural Histories which are extant, being gathered for delight and use, are full of pleasant Descriptions and Pictures; and affect and seek after Admiration, Rarities, and Secrets. But contrariwise, the scope, which his Lordship intendeth, is to write such a Natural History, as may be fundamental to the erecting and building of a true Philosophy: For the illumination of the Understanding; the extracting of Axioms, and the producing of many noble Works and Effects. For he hopeth by this means, to acquit himself of that, for which he taketh himself in a sort bound; and that is, the advancement of Learning and Sciences. For having, in this present Work, collected the materials for the Building; and in his Novum Organum (of which his Lordship is yet to publish a Second Part) set down the Instruments and Directions for the Work; Men shall now be wanting to themselves, if they raise not knowledge to that perfection, whereof the Nature of Mortal Men is capable. And in this behalf, I have heard his Lordship speak complainingly, That his Lordship (who thinketh, that he deserveth to be an Architect in this Building) should be forced to be a Workman, and a Laborer; and to dig the Clay, and burn the Brick; and more then that, (according to the hard condition of the Israelites, at the latter end) to gather the Straw and Stubble, over all the Fields, to burn the Bricks withal. For he knoweth, that except he do it, nothing will be done; Men are so set to despise the means of their own good. And as for the baseness of many of the Experiments, as long as they be Gods Works, they are honorable enough: And for the vulgarness of them, true Axioms must be drawn from plain experience, and not from doubtful; and his Lordships course is to make Wonders plain, and
To the Reader.

and not plain things \(V\) Wonders; and that experience, likewise must be broken and grinded, and not whole, or as it growth; and for Use, his Lordship bath often in his Mouth, the two kinds of Experiments, Experimenta Fructifera, and Experimenta Lucifera. Experiments of Use, and Experiments of Light: And he reporteth himself, whether he were not a strange Man, that should think, that Light hath no Use, because it hath no Matter. Further his Lordship thought good also, to add unto many of the Experiments themselves, some gloss of the Causes, that in the succeeding work of Interpreting Nature, and Framing Axioms, all things may be in more readiness. And for the Causes herein by him assigned; his Lordship perswadeth himself, they are far more certain, than those that are rendered by others; not for any excellency of his own wit, (as his Lordship is wont to say) but in respect of his continual conversation with Nature and Experience. He did consider likewise, That by this Addition of Causes, Mens minds (which make so much haste to finde out the causes of things;) would not think themselves utterly lost in a vast Wood of Experience, but stay upon these Causes (such as they are) a little, till true Axioms may be more fully discovered. I have heard his Lordship say also, That one great reason, why he would not put these Particulars into any exact Method, (though he, that looketh attentively into them, shall finde, that they have a secret order) was, Because he conceived that other men would now think that they could do the like; and so go on with a further Collection, which, if the Method had been exact, many would have despaired to attain by Imitation. As for his Lordships love of Order, I can refer any Man to his Lordships Latin Book, De Augmentis Scientiarum; which, if my judgment be anything, is written in

\[B\]
The Epistle

is the same,

that should

have been

prefixed to

this Book, if

his Lordship

had lived.

the exactest order, that I know any writing to be. I will conclude, with a usual Speech of his Lordships. That this Work of his Natural History, is the World, as God made it, and not as Men have made it; for that it hath nothing, if Imagination.

W. RAWLEY.
The Table.

A Table of the Experiments.

Century I.

Of Straining or Percolation, Outward and Inward, Experiment 8, page 1
Of Motion upon Pressure, Exp. 5
Of Separations of Bodies Liquid by Weight, Exp. 3
Of Infusions in Water and Air, Exp. 7
Of the Appease of Continuance in Liquids, Exp. 1
Of Artificial Springs, Exp. 1
Of the Venemous Quality of Mans Flees, Exp. 1
Of Turning Air into Water, Exp. 1
Of Helping or Altering the Shape of the Body, Exp. 1
Of Condensing of Air to yield Weight, or Nourishment, Exp. 1
Of Flame and Air commixed, Exp. 1
Of the secret nature of Flame, Exp. 1
Of Flame in the midst and on the Sides, Exp. 1
Of Motion of Gravity, Exp. 1
Of Contradiction of Bodies in Bulk, Exp. 1
Of making Vines more fruitful, Exp. 1
Of the several Operations of Purging Medicines, Exp. 9
Of Meats and Drinks most Nourishing, Exp. 15
Of Medicines applied in Order, Exp. 1
Of Cure by Culsole, Exp. 1
Of Cure by Excess, Exp. 1
Of Cure by Motion of Consent, Exp. 1
Of Cure of Diseases contrary to Predisposition,
Of Preparation before and after Purging, Exp. 1
Of Stanching Blood, Exp. 1
Of change of Aliments and Medicines, Exp. 1
Of Diets, Exp. 1
Of Production of Cold, Exp. 7
Of turning Air into Water, Exp. 7
Of Induration of Bodies, Exp. 8
Of Presing of Air upon Water, Exp. 1
Of the force of Union, Exp. 1
Of clipping Feathers and Hairs of divers colours, Exp. 1
Of Nourishment of Young Creatures in the Egg or Womb, Exp. 1
Of Sympathy and Antipathy, Exp. 1
Of the Spirits or Pneumatics in Bodies, Exp. 1
Of the Power of Heat, Exp. 1
Of Impossibility of Annihilation, Exp. 1

Century II.

Of Music, Exp. 14
Of the Nullity and Unity of Sounds, Exp. 4
Of Production, Conservation, and Dilation of Sounds, Exp. 14
Of Magnitude, Excellency, and Damps of Sounds, Exp. 25
Of Lou'dness, loud Softness, of Sound, Exp. 3

B 2
## Century III.

Of the Lines in which Sounds move. Exp. 6. pag. 49
Of the Losing or Persisting of Sounds. Exp. 5 pag. 50
Of the Passage in Interruption of Sounds. Exp. 5 pag. 51
Of the Medium of Sounds. Exp. 4 pag. 52
Of the Figures of Bodies yielding Sounds. Exp. 3 pag. 53

### Of Mixture of Sounds. Exp. 5.

- ibid.

### Of Mutilation of Sounds. Exp. 7.

- ibid.

### Of Imitation of Sounds. Exp. 6.

- ibid.

### Of Reflection of Sounds. Exp. 13.

- ibid.

- ibid.

### Of Coofent and Disent between Audible, and Visible. Exp. 23.

- ibid.

### Of Sympathy and Antipathy of Sounds. Exp. 5.

- ibid.

### Of Hindring or Helping of Hearing. Exp. 4.

- ibid.

### Of the Spiritual and Fine Nature of Sounds. Exp. 4.

- ibid.

### Of Orient Colours in Dissolutions of Metals. Exp. 1.

- ibid.

### Of Prolongation of Life. Exp. 1.

- ibid.

### Of the Appetite of Union in Bodies. Exp. 1.

- ibid.

### Of the like Operations of Heat and Time. Exp. 1.

- ibid.

### Of the Differing operations of Fire and Time. Exp. 1.

- ibid.

### Of Motions by Imitation. Exp. 1.

- ibid.

### Of Infections. Diseases. Exp. 1.

- ibid.

### Of the Incorporations of Powders, and Liquors. Exp. 1.

- ibid.

### Of Exercise of the Body, and the Benefits or Evils thereof. Exp. 1.

- ibid.

### Of Means some Glutting, or not Glutting. Exp. 1.

- ibid.

## Century IV.

Of Clarification of Liquors, and the Accelerating thereof. Exp. 11 pag. 57
Of Maturation, and the Accelerating thereof; and of the Maturation of Drink, and Fruits. Exp. 13 pag. 60
Of Making Gold. Exp. 1 pag. 62
Of the Several Natures of Gold. Exp. 1 ibid.
Of Inducing and Accelerating Purification. Exp. 12 ibid.
Of Prohibiting and Preventing Purification. Exp. 1 ibid.
Of Rotten Wood Binding. Exp. 1 ibid.
Of Acceleration of Birth. Exp. 1 ibid.
Of Acceleration of Growth and Stature. Exp. 1 ibid.
Of Bodies Sulphurous and Mercurial. Exp. 5 ibid.
Of the Chameleon. Exp. 1 ibid.
Of Subterrany Fires. Exp. 1 ibid.
Of Nitrous water. Exp. 1 ibid.
Of Congelation of Air. Exp. 1 ibid.
Of Congelation of Water into Crystal. Exp. 1 ibid.
Of Preserving the Smell and Colour in Rose-Leaves. Exp. 1 ibid.
Of the Losing of Flame. Exp. 10 ibid.
Of Infections or Burials of divers bodies in Earth. Exp. 5 ibid.
Of the Affeets of Mens bodies from several Winds. Exp. 1 ibid.
Of Winter and Summer Sicknesses. Exp. 1 ibid.

---

**Table:**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of communication of Sounds.</td>
<td>3</td>
</tr>
<tr>
<td>Of Equality and Inequality of Sounds.</td>
<td>9</td>
</tr>
<tr>
<td>Of more Treble and Base Tones.</td>
<td>8</td>
</tr>
<tr>
<td>Of proportion of Treble and Base.</td>
<td>4</td>
</tr>
<tr>
<td>Of Exterior, Interior Sounds.</td>
<td>4</td>
</tr>
<tr>
<td>Of Articulation of Sounds.</td>
<td>9</td>
</tr>
<tr>
<td>Of the Lines in which Sounds move.</td>
<td>6</td>
</tr>
<tr>
<td>Of the Losing or Persisting of Sounds.</td>
<td>5</td>
</tr>
<tr>
<td>Of the Passage in Interruption of Sounds.</td>
<td>5</td>
</tr>
<tr>
<td>Of the Medium of Sounds.</td>
<td>4</td>
</tr>
<tr>
<td>Of the Figures of Bodies yielding Sounds.</td>
<td>3</td>
</tr>
<tr>
<td>Of Mixture of Sounds.</td>
<td>5</td>
</tr>
<tr>
<td>Of Mutilation of Sounds.</td>
<td>7</td>
</tr>
<tr>
<td>Of Imitation of Sounds.</td>
<td>6</td>
</tr>
<tr>
<td>Of Reflection of Sounds.</td>
<td>13</td>
</tr>
<tr>
<td>Of Coosent and Disent between Audible, and Visible.</td>
<td>23</td>
</tr>
<tr>
<td>Of Sympathy and Antipathy of Sounds.</td>
<td>5</td>
</tr>
<tr>
<td>Of Hindring or Helping of Hearing.</td>
<td>4</td>
</tr>
<tr>
<td>Of the Spiritual and Fine Nature of Sounds.</td>
<td>4</td>
</tr>
<tr>
<td>Of Orient Colours in Dissolutions of Metals.</td>
<td>1</td>
</tr>
<tr>
<td>Of Prolongation of Life.</td>
<td>1</td>
</tr>
<tr>
<td>Of the Appetite of Union in Bodies.</td>
<td>1</td>
</tr>
<tr>
<td>Of the like Operations of Heat and Time.</td>
<td>1</td>
</tr>
<tr>
<td>Of the Differing operations of Fire and Time.</td>
<td>1</td>
</tr>
<tr>
<td>Of Motions by Imitation.</td>
<td>1</td>
</tr>
<tr>
<td>Of Infections. Diseases.</td>
<td>1</td>
</tr>
<tr>
<td>Of the Incorporations of Powders, and Liquors.</td>
<td>1</td>
</tr>
<tr>
<td>Of Exercise of the Body, and the Benefits or Evils thereof.</td>
<td>1</td>
</tr>
<tr>
<td>Of Means some Glutting, or not Glutting.</td>
<td>1</td>
</tr>
<tr>
<td>Of Clarification of Liquors, and the Accelerating thereof.</td>
<td>11</td>
</tr>
<tr>
<td>Of Maturation, and the Accelerating thereof; and of the Maturation of Drink, and Fruits.</td>
<td>13</td>
</tr>
<tr>
<td>Of Making Gold.</td>
<td>1</td>
</tr>
<tr>
<td>Of the Several Natures of Gold.</td>
<td>1</td>
</tr>
<tr>
<td>Of Inducing and Accelerating Purification.</td>
<td>12</td>
</tr>
<tr>
<td>Of Prohibiting and Preventing Purification.</td>
<td>1</td>
</tr>
<tr>
<td>Of Rotten Wood Binding.</td>
<td>1</td>
</tr>
<tr>
<td>Of Acceleration of Birth.</td>
<td>1</td>
</tr>
<tr>
<td>Of Acceleration of Growth and Stature.</td>
<td>1</td>
</tr>
<tr>
<td>Of Bodies Sulphurous and Mercurial.</td>
<td>5</td>
</tr>
<tr>
<td>Of the Chameleon.</td>
<td>1</td>
</tr>
<tr>
<td>Of Subterrany Fires.</td>
<td>1</td>
</tr>
<tr>
<td>Of Nitrous water.</td>
<td>1</td>
</tr>
<tr>
<td>Of Congelation of Air.</td>
<td>1</td>
</tr>
<tr>
<td>Of Congelation of Water into Crystal.</td>
<td>1</td>
</tr>
<tr>
<td>Of Preserving the Smell and Colour in Rose-Leaves.</td>
<td>1</td>
</tr>
<tr>
<td>Of the Losing of Flame.</td>
<td>10</td>
</tr>
<tr>
<td>Of Infections or Burials of divers bodies in Earth.</td>
<td>5</td>
</tr>
<tr>
<td>Of the Affeets of Mens bodies from several Winds.</td>
<td>1</td>
</tr>
<tr>
<td>Of Winter and Summer Sicknesses.</td>
<td>1</td>
</tr>
</tbody>
</table>
Century V.

Of Accelerating or Hastening Forward Germination, Exp. 12
Of Retarding or putting back Germination, Exp. 9
Of Meliorating, or making better, Fruits and Plants, Exp. 55
Of Compound Fruits, and Flowers, Exp. 55
Of sympathy and Antipathy of Plants, Exp. 19
Of making Herbs and Fruits Medicinal, Exp. 3

Century VI.

Of Curiosities about Fruits and Plants, Exp. 17
Of the Degenerating of Plants, and of their Transmutation one into another, Exp. 14
Of the Procrery and Lowness of Plants; and of Artificial dwarfing them, Exp. 5, pag. 128
Of the Rudiments of Plants; and of the Excrences of Plants; or Super-Plants, Exp. 36
Of Producing perfect Plants without Seed, Exp. 11
Of Foreign Plants, Exp. 3
Of the Seasons of several Plants, Exp. 6
Of the Lesion of Plants, Exp. 5
Of several Figures of Plants, Exp. 3
Of some Principal differences in Plants, Exp. 4
Of all Manner of Composits and Helps for Ground, Exp. 6

Century VII.

Of the Affinities and Differences between Plants, and Bodies Inanimate, Exp. 6
Pag. 125

Of Affinities and Differences between Plants, and Living Creatures; And of the Conformities and Participles of Earth, Exp. 3
Pag. 116

Of Plants Experiments Promiscuous, Exp. 67
Pag. 127

Of Heating of Metals, Exp. 1
Pag. 139

Of Fusible in Flesh, Exp. 1
Pag. 130

Of Ripening Drinks speedily, Exp. 1
Pag. 140

Of Rolysey and Plumage, Exp. 1
Pag. 141

Of the Quickness of Motion in Birds, Exp. 1
Pag. 142

Of the Clearness of the Sea, the Northwind blowing, Exp. 1
Pag. 143

Of the different heats of Fire and boiling water, Exp. 1
Pag. 144

Of the Qualification of heat by Moisture, Exp. 1
Pag. 145

Of Tawning, Exp. 1
Pag. 146

Of the Hicceuchs, Exp. 1
Pag. 147
Century VIII.

Of Vains of Earth Medicinal, Exp. 1
Of Sponges, Exp. 1  pag. 147
Of Sea-fish in fresh waters, Exp. 1
Of Attraction by similitude of substance, Exp. 1
Of certain Drinks in Turkey, Exp. 1
Of Sleep, Exp. 1
Of the Glosworm, Exp. 1
Of the impressions upon the Body, from several Passions of the Mind, Exp. 10
Of Drunkenness, Exp. 4
Of the Hurt, or help of wine taken moderately, Exp. 1
Of Caterpillar, Exp. 1
Of the Flies Cantharides, Exp. 1
Of Lassitude, Exp. 3
Of casting the Skin and Shell in some Creatures, Exp. 1
Of the Pustules of the Body, Exp. 3
Of Pestilential year, Exp. 1
Of some Prognosticks of hard Winters, Exp. 1
Of certain Medicines that condense and relieve the Spirits, Exp. 1
Of Paintings of the Body, Exp. 1
Of the use of Basting and Anointing, Exp. 1
Of Chamolletting of Paper, Exp. 1
Of Cattle-Ink, Exp. 1
Of Earth increasing in weight, Exp. 1
Of Sleep, Exp. 3
Of Teeth and hard substances in the Bodies of Living Creatures, Exp. 11
Of the Generation, and bearing of living Creatures in the womb, Exp. 3
Of Species Visible, Exp. 2
Of Impulson and Percussior, Exp. 3
Of Tittilation, Exp. 1
Of scarcity of Rain in Egypt, Exp. 1
Of Clarification, Exp. 1
Of Plants without leaves, Exp. 1
Of the materials of Glass, Exp. 1
Of Prohibition of Purification, and the long conservation of Bodies, Exp. 1
Of Abundance of Nitre in certain Seas-shores, Exp. 1
Of Bodies born up by water, Exp. 1
Of Fuel consuming little or nothing, Exp. 1
Of cheap Fuel, Exp. 1
Of Gathering of wind for Freshness, Exp. 1
Of Trials of Airs, Exp. 1
Of increasing Milk in Milk-Beasts, Exp. 1
Of Sand of the Nature of Glass, Exp. 1
Of the Growth of Corral, Exp. 1
Of the Gathering of Manna, Exp. 1
## Century IX.

### Perception in Bodies insensible, tending to natural Divination and subtile triads, Exp. 10
- Of the Causes of Appetite in the Stomach, Exp. 1
- Of sweetness of Smell from the Rain, Bow, Exp. 1
- Of sweet Smells, Exp. 1
- Of the Corporal substance of Smells, Exp. 1
- Of Taste and Fragrant Odours, Exp. 1
- Of the Causes of Putrefaction, Exp. 1
- Of Bodies unperfectly mixt., Exp. 1
- Of Concision and Crudity, Exp. 1
- Of Alterations which may be called Major, Exp. 1
- Of Bodies Liquefiable, and not Liquefiable, Exp. 1
- Of Bodies Fragile and Tough, Exp. 1
- Of the two kinds of Pneumaticalls in Bodies, Exp. 1
- Of Concretion and dissolution of Bodies, Exp. 1
- Of Bodies hard and soft, Exp. 1
- Of bodies dullish and tenfis, Exp. 1
- Of several passion of Matter, and characters of Bodies, Exp. 1
- Of seduction by sympathy, Exp. 1
- Of Honey and Sugar, Exp. 1
- Of the four sort of base Metals, Exp. 1
- Of certain Cement and Quarries, Exp. 1
- Of the Altering of colours in Hairs and Feathers, Exp. 1
- Of the difference of Living Creatures, Male and Female, Exp. 1
- Of the Comparative Magnitude of Living Creatures, Exp. 1
- Of Producing Fruits without Cear or Stone, Exp. 1
- Of the Melioration of Tobacco, Exp. 1
- Of several Heatts working the same Effects, Exp. 1
- Of Smelling and Dilatation in Boyleing, Exp. 1
- Of the Deterioration of Fruits, Exp. 1
- Of Flesh Edible, and not Edible, Exp. 1
- Of the Salamander, Exp. 1
- Of the contrary operations of Time, upon Fruits and Liquors, Exp. 1
- Of blowes and bruisers, Exp. 1
- Of the Orris Root, Exp. 1
- pag. 182
- Pag. 171
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
- Ibid.
The Table.

Of the compression of Liquors. Exp. 1
Of the working of Water upon Air contiguous. Exp. 1
Of the Nature of Air. Exp. 1
Of the Eyes and Sight. Exp. 7
Of the colour of the Sea, or other water. Exp. 1
Of Shell-Fish. Exp. 1
Of the Right side and the Left. Exp. 1
Of Felicities. Exp. I
Of Shadows. Exp. 1
Of the Raving and breaking of the Sea. Exp. 1
Of the Decoration of Salt-water. Exp. 1
Of the return of saltiness in pits by the Sea-shore. Exp. 1
Of Attraction by similitude of substance. Exp. 1
Of Attraction. Exp. 1
Of Heat under earth. Exp. 1
Of Flying in the Air. Exp. 1
Of the Scarlet Dy. Exp. 1
Of Manifesting. Exp. 1
Of the Rise of Liquors or Pouders, by means of Flames. Exp. 1
Of the influences of the Moon. Exp. 1
Of Vinegar. Exp. 1
Of Creatures that sleep all Winter. Exp. 1
Of the Generating of Creatures by Copulation, and by Putrefaction. Exp. 1

Century X.

Of the Transmission and influx of Immateriate Virtues and the Force of Imagination; whereas there be Experiments Monitory, three in all. Exp. 11 pag. 197
Of Emission of Spirits in Vapour, or Exhalation, odour like. Exp. 26 pag. 201
Of Emission of Spiritual Species which affect the Senses. Exp. 1 pag. 204
Of Emission of Immateriate Virtues, from the Minds, and the Spirits of Men, by Affections, Imagination, or other Impressions. Exp. 21 ibid:
Of the secret virtue of Sympathy, and Antipathy. Exp. 20 pag. 203
Of secret Virtues and Properties. Exp. 1 pag. 214
Of the General Sympathy of mens Spirits. Exp. 1 pag. 215
THE
LIFE
OF THE
RIGHT HONOURABLE
FRANCIS BACON
Baron of VERULAM, Viscount St. ALBAN.

BY
WILLIAM RAWLEY, D.D.
His Lordship's first and last Chaplain, and of late his
Majesties Chaplain in Ordinary.

LONDON,
Printed by S. G. & B G. for William Lee, and are to be sold at the sign
of the Turks-Head in Fleet street, over against Fetter-Lane, 1670.
THE LIFE OF THE RIGHT HONOURABLE FRANCIS BACON
Baron of Verulam, Viscount St. Alban.

Francis Bacon the glory, of his Age and Nation; The Adorner, and Ornament of Learning; Was born in York-house or York-Place, in the Strand, On the 22th, Day of January; in the Year of our Lord, 1560. His Father was that famous Councillor to Queen Elizabeth, The second Prop of the Kingdom in his Time, Sir Nicholas Bacon, Knight, Lord Keeper of the Great Seal of England; a Lord of known Prudence, Sufficiency, Moderation, and Integrity. His Mother was Ann, one of the Daughters of Sir Anthony Cook; unto whom the Erudition, of King Edward the Sixth, had been committed: A choise Lady, and Eminent for Piety, Vertue, and Learning; Being exquisitely skilled, for a Woman, in the Greek, and Latin, Tongues. These being the Parents, you may easily imagine,
what the Issue, was like to be; Having had whatsoever Nature or Breeding could put into him.

His first and childish years were not without some Mark of Eminency; At which time he was indued with that Pregnancy, and Towardliness, of wit; As they were Preages, of that Deep, and Universal Apprehension, which was manifest in him, afterward: And caused him to be taken notice of, by several Persons, of Worth and Place; And especially, by the Queen; who (as I have been informed) delighted much, then, to confer with him; And to prove him with Questions, unto whom, he delivered Himself, with that Gravity, and Maturity, above his years; That Her Majesty would often term him, The young Lord Keeper. Being asked by the Queen, how old he was? He answered with much discretion, being then but a Boy; That he was two years younger than her Majesties happy Reign; with which answer the Queen was much taken.

At the ordinary years, of Ripeness, for the University; or rather, something earlier; he was sent by his Father, to Trinity Colledge, in Cambridge; To be educated, and bred under the Tuition of Doctor John White-Gift, then Master of the Colledge; Afterwards the renowned Arch Bishop of Canterbury; a Prelate of the first Magnitude of Sanctity, Learning, Patience, and Humility; Under whom, He was observed, to have been more, than an Ordinary Proficient, in the several Arts and Sciences. Whilst he was commanant, in the University, about 16 years of age; (as his Lordship hath been pleased to impart unto my self;) he first fell into the Dislike, of the Philosophy of Aristotle: Not for the Worthleffeness of the Author, to whom he would ever ascribe all High Attributes; But for the Vnfruitfulness, of the way; Being a Philosophy, (as his Lordship used to say) only Strong, for Disputations, and Contentions; But Barren, of the production of Works, for the Benefit of the Life of Man. In which Mind he continued to his Dying Day.

After he had pass'd, the Circle of the Liberal Arts; His Father thought fit, to frame, and mould him for the Arts of State; and, for that end, sent him over into France, with Sir
Sir Amyas Paulet, then Employed Ambassadour Lieger, into France; By whom, he was, after awhile, held fit to be entrusted, with some Message, or Advertisement, to the Queen; which having performed with great Approbation, he returned back into France again; with intention to continue, for some years, there. In his absence, in France, his Father, the Lord Keeper, died; Having collected, (as I have heard, of Knowing Persons) a considerable sum of Money, which he had separated, with Intention, to have made a competent Purchase of Land, for the Lively-hood of this his youngest Son; (who was only unprovided for; and though he was the youngest in years, yet he was not the lowest, in his Fathers affection;) But the said Purchase, being unaccomplished, at his Fathers Death, there came no greater Share to him, than his single Part, and Portion, of the Money, dividable amongst some Brethren; By which means, be lived, in some Straits, and Necessities, in his younger years. For as for that pleasant Seat, and Manor of Gorhambury, he came not to it, till many years after, by the Death, of his Dearest Brother, Mr. Anthony Bacon; a Gentleman, equal to him, in Height of Wit; Though inferior to him, in the Endowments of Learning and Knowledge; Unto whom he was, most nearly conjoined in affection; They two being the sole Male-issue of a second Venter.

Being returned from Travail, he applied himself, to the Study of the Common-Law; which he took upon him to be his Profession. In which, he obtained to great Excellency. Though he made that, (as himself said) but as an accessory, and not as his Principal study. He wrote several Tracts, upon that Subject. Wherein, though some great Masters, of the Law did out-go him in Bulk, and Particularities of Cases; yet, in the Science, of the Grounds, and Mysteries, of the Law, he was exceeded by none. In this way, he was after a while, sworn, of the Queens Counsel Learned, Extraordinary; a grace, (if I err not) scarce known before. He seated himself for the commodity of his Studies, and Practice; amongst the Honourable Society, of Greys-Inn; Of which Houle; he was a Member; where he Erected, that
The Life of the Right Honorable

that Elegant Pile, or Structure, commonly known by the Name of the Lord Bacon's Lodgings; which he inhabited by turns, the most part of his Life; (some few years only excepted,) unto his Dying Day. In which House he carried himself, with such Sweetness, Comity, and Generosity; That he was much reverend, and beloved, by the Readers and Gentlemen of the House.

Notwithstanding, that he professed the Law for his Livelihood, and Subsistence; yet his Heart and Affection was more carried after the Affairs and Places of Estate; for which, if the Majesty Royal then, had been pleased, he was most fit. In his younger years, he studied the Service, and Fortunes, (as they call them,) of that Noble, but unfortunate Earl, the Earl of Essex; unto whom he was, in a sort, a Private and free Counsellor, and gave him Safe and Honourable Advice; till, in the end, the Earl inclined too much, to the violent and precipitate Counsell of others, his Adherents, and Followers, which was his Fate and Ruine.

His Birth and other Capacities qualified him, above others of his Profession, to have ordinary accesses at Court; and to come frequently into the Queen's Eye, who would often grace him with private and free Communication; Not only about Matters of his Profession, or Business in Law; But also, about the arduous Affairs of Estate; From whom she received, from time to time, great Satisfaction. Nevertheless, though she cheered him much, with the Bounty of her Countenance; yet she never cheered him with the Bounty of her Hand; Having never conferred upon him, any Ordinary Place or Means of Honour or Profit, Save only one dry Reversion of the Registers Office, in the Star-Chamber; worth about 1600l. per Annum; For which he waited in Expectation, either fully or near twenty years; Of which his Lordship would say, in Queen Elizabeth's Time; That it was like another man's Ground, but calling upon his House; which might mend his Prospect, but it did not fill his Barn. (Nevertheless in the time of King James, it fell unto him, Which might be imputed; not so much to her Majesties averseness and Disaffection, towards him; as
as the Arts and Policy of a Great Statesman, then, who laboured by all industrious, and secret Means, to suppress, and keep him down; lest, if he had risen, he might have obscured his Glory.

But though he stood long at a stay, in the Days of his Mistress Queen Elizabeth; Yet, after the change, and Coming in of his New Master, King James, he made a great progress; by whom he was much comforted, in Places of Trust, Honour, and Revenue. I have seen, a Letter of his Lordships, to King James, wherein he makes Acknowledgement, That he was that Master to him, that had raised and advanced him nine times; Thrice in Dignity, and Six times in Office. His Offices (as I conceive) were Counsel learned extraordinary, to his Majesty, as he had been, to Queen Elizabeth; Kings Solicitor General; His Majesties Attorney General; Counsellor of Estate, being yet but Attorney; Lord Keeper of the Great Seal of England. Lastly, Lord Chancellor: which two last Places, though they be the same, in Authority and Power, yet they differ, in Patent, Height, and Favour of the Prince. Since whose time, none of his Successors, until this present Honourable Lord; did ever bear the Title of Lord Chancellor. His Dignities were first Knight, then Baron of Verulam; Lastly, Viscount Saint Alban: Besides other good Gifts and Bounties of the Hand, which his Majesty gave him, Both out of the Broad-Seal, and out of the Alienation-Office, To the value, in both of eighteen hundred pounds per annum; which with his Mannour of Gorhambury; and other Lands and Possessions, neartherunto adjoining, amounting to a third part more, he retained to his Dying Day.

Towards his Rising years, not before, he entered into an married Estate, and took to Wife, Alice, one of the Daughters, and Co-heirs of Benedict Barnham, Esquire, and Alderman of London, with whom he received, a sufficiently ample, and liberal Portion, in Marriage. Children he had none: which, though they be the means to perpetuate our Names, after our Deaths; yet he had other Issues, to perpetuate his Name; The Issues of his Brain, in which he was ever
The Life of the Right Honorable

over happy, and admired; as Jupiter was, in the production of Pallas. Neither did the want of Children, detract from his good usage of his Confort, during the Intermarriage, whom he prosecuted, with much Conugal Love, and Respect; with many Rich Gifts, and Endowments; Besides a Robe of Honour, which he invested her withal; which she wore until her Dying Day; being twenty years and more, after his Death.

The last five years of his Life, being with drawn from Civil affairs, and from an Active Life, he employed wholly in Contemplation and Studies. A thing, whereof his Lordship would often speak, during his Active Life; as if he affected to dye in the Shadow, and not in the Light; which also may be found in several Passages of his Works. In which time he compos'd, the greatest part of his Books, and Writings; both in English and Latine; Which I will enumerate, (as near as I can) in the just order, wherein they were written. The History of the Reign of King Henry the Seventh; Abcedarium Nature; or a Metaphysical piece, which is lost; Historia Ventorum; Historia Vite & Mortis; Historia Denfi & Rari; not yet printed; Historia Gravis & Levis, which is also lost; A Discourse of a War with Spain; A Dialogue, touching an Holy War. The Fable of the New Atlantis. A Preface to a Digest of the Laws of England. The Beginning, of the History of the Reign of King Henry the Eighth. De Augmentis Scientiarum, Or the Advancement of Learning, put into Latin, with several Enrichments and Enlargements. Counsels Civil, and Moral. Or his Book of Essays, likewise Enriched and Enlarged. The Conversion of certain Psalms, into English Verfe. The Translation into Latin, of the History of King Henry the Seventh. Of the Counsels (Civil and Moral. Of the Dialogue of the Holy War. Of the Fable of the New Atlantis; For the Benefit of other Nations. His Revising of his Book, De Sapientia Vetrorum. Inquisitio de Magnete, Topica Inquisitionis, de Luce & Lumine; Both these not yet Printed. Lastly, Sylva sylvarum, or the Natural History. These were the Fruits,
Francis Lord Bacon.

Fruits and Productions, of his last five years. His Lordship also designed upon the Motion and Invitation of his late Majesty; to have written the Reign of King Henry the Eighth; But that Work Perished in the Designation merely; God not lending him Life, to proceed further upon it, then only in one Mornings Work: whereof there is Extant, An Ex Ungue Leonem, already Printed, in his Lordships Miscellaneous Works.

There is a Commemoration due; As well, to his Abilities, and Virtues, as to the Course of his Life. Those Abilities, which commonly go single in other Men, though of prime, and Observable, Parts, were all conjoined, and met in Him. Those are, Sharpness of Wit, Memory, Judgment, and Elocution. For the Former Three, his Books do abundantly speak them; which, with what Sufficiency he wrote, let the World judge; But with what Celerity he wrote them, I can best testify. But for the Fourth, his Elocution; I will only set down what I heard, Sir Walter Rawleigh, once speak of him, by way of Comparison; ( whose Judgment may well be trusted;) That the Earl of Salisbury, was an excellent Speaker, but no good Pen-man; That the Earl of Northampton, (the Lord Henry Howard,) was an excellent Pen-man, but no good speaker; But that Sir Francis Bacon, was Eminent in both.

I have been endured to think; That if there were, a Beam of Knowledge derived from God upon any Man, in these Modern Times, it was upon Him. For though he was a great Reader of Books; yet he had not his Knowledge from Books; but from some Grounds, and Notions from within Himself: Which notwithstanding, he vested with great Caution and Circumpection. His Book, of Instauration Magna, (which, in his own Account, was the chiefest of his Works,) was no Slight Imagination, or Fancy, of his brain; but a settled, and Concocted Notion; The Production of many years, Labour, and Travel. I my Self, have seen, at the least, Twelve Copies, of the Instauration; Revised, year by year, one after another; And every year altered, and amended.
in the Frame thereof; Till, at last, it came to that Model, in which it was committed to the Prebends; As many Living Creatures, do lick their young ones, till they bring them, to their strength of Limbs.

In the Compiling of his Books, he did rather drive as a Masculine and clear Expression, than at any Finenes, or Affectation of Phrases, and would often ask, if the Meaning were expressed plainly enough: as being one that accounted words to be but subservient, or Ministerial, to Matter; and not the principal. And if his Style were Police, it was because he could do no otherwise. Neither was be given, to any Light Conceits; Or Defcanting upon Words; But did ever, purposely, and industriously, avoid them; For he held such Things, to be but Digressions, or Diversions, from the Scope intended; and to derogate, from the Weight and Dignity of the Stile.

He was no Plodder upon Books; Though he read much, and that with great Judgement and Rejection of Impertinences, incident to many Authors; For he would ever interlace a Moderate Relaxation of his Minde with his Studies; As Walking, Or Taking the Air abroad in his Coach; or some other befitting Recreation; and yet, he would loose no Time, In as much, as upon his First, and Immediate Return, he would fall to Reading again, and so suffer no Moment of Time to Slip from him without some present Improvement.

His Meales were Reflections of the Eare as well as of the Stomack: Like the Noctes Attice; or Convivia Deipno-Sophistarum; Wherein a Man might be refreshed in his Mind and understanding, no less then in his Body. And I have known some, of no mean Parts, that have professed to make use of their Note-Books, when they have risen from his Table. In which Conversations, and otherwise, he was no Dafting Man, as some men are; But ever a Counterancer, and Fosterer, of another Mans Parts. Neither was he one, that would appropriate the Speech, wholly to Himself; or delight to out-vie others: But leave a Liberty, to the Co-Assidours, to take their Turns. Wherein he would draw a Man
Man on, and allure him, to speak upon such a subject, as wherein he was peculiarly skilful, and would delight to speak. And, for himself, he esteemed no Man’s observations, but would light his torch at every man’s candle.

His opinions and assertions were, for the most part, binding, and not contradicted by any; rather like oracles, than discourses. Which may be imputed, either to the well weighing of his sentence, by the scales of truth, and reason; or else to the reverence and estimation, wherein he was commonly had, that no man would contend with him: so that there was no argumentation, or pro and con (as they term it) at his table: or if there chanced to be any it was carried with much submision and moderation.

I have often observed, and so have other men of great account, that if he had occasion to repeat another man’s words after him, he had an use and faculty to dress them in better vestments, and apparel then they had before: so that the author should find his own speech much amended; and yet the substance of it still retained: as if it had been natural to him to use good forms; as Ovid speak of his faculty of versifying.

Et quod tentabam scribere, Verlus erat,

When his office called him, as he was of the kings counsel learned, to charge any offenders, either in criminals, or capitals; he was never of an insulting, or domineering nature over them; but always tender hearted, and carrying himself decently towards the parties; (though it was his duty, to charge them home:) but yet, as one, that looked upon the example, with the eye of severity, but upon the person, with the eye of pity, and compasstion. And in civil business, as he was councillor of estate, he had the best way of advising; not engaging his master, in any precipitate or grievous courses, but in moderate and fair proceedings: the king, whom he served, giving him this testimony; that he ever dealt in business, suaribus modis.
The Life of the Right Honorable

Modis; Which was the way that was most according to his own heart.

Neither was he in his time less gracious with the Subject than with his Sovereign. He was ever acceptable to the House of Commons, when he was a Member thereof. Being the Kings Attorney, and chosen to a place in Parliament; he was allowed and dispensed with to sit in the House; which was not permitted to other Attorneys.

And as he was a good Servant to his Master; Being never in nineteen years service (as he himself aversed,) rebuked by the King for any Thing relating to his Majesty; So he was a good Master to his Servants, And rewarded their long attendance with good Places, freely when they fell into his Power. Which was the Cause that so many young Gentlemen of Blood and Quality, sought to list themselves in his Retinue. And if he were abused by any of them in their Places, It was onely the Error, of the Goodness, of his Nature; but the Badges of their Indiscretions, and Intemperances.

This Lord was Religious; For though the World be apt to suspect, and prejudice, Great Wits, and Politicks to have somewhat of the Atheist; Yet he was conversant with God: as appeareth, by several Passages, throughout the whole Current of his Writings. Otherwise he should have crossed his own Principles; which were, That a little Philosophy, maketh Men apt to forget God; As attributing too much to second Causes; But Depth of Philosophy, bringeth Men back to God again. Now I am sure, there is no Man that will deny him, or account otherwise of him, but to have him been a deep Philosopher. And not only so, But he was able to render a Reason of the Hope which was in him; Which that Writing of his, of the Confession of the Faith, doth abundantly testify. He repaired frequently, when his Health would permit him, to the Service of the Church, To hear Sermons, To the Administration of the Sacrament of the Blessed Body and Blood of Christ; And died in the true Faith established in the Church of England.
Francis Lord Bacon.

This is most true, he was free from Malice; which, (as he said Himself, ) He never bred nor fed. He was no Reven-ger of Injuries; which, if he had minded, he had both Opportu-nity and Place High enough, to have done it. He was no Heaver of Men out of their Places; as delighting in their Ruine and undoing. He was no defainer of any Man to his Prince. One Day, when a great States-Man was newly Dead, That had not been his Friend; The King asked him, What he thought of that Lord, which was gone? He an-swered, That he would never have made his Majesties Estate better; But he was sure he would have kept it from being worse. Which was the worst, he would say of him. Which I reckon, not among his Moral, but his Christian Virtues.

His Fame is greater, and sounds louder in Forraign Parts abroad, than at home in his own Nation. Threby verifying that Divine Sentence, A Prophet is not without honour, save in his own Country, and in his own house. Concerning which I will give you a Table only, out of a Letter, written from Italy (The Store-house of Refined Wits) to the late Earl of Devonshire, Then, the Lord Candith. I will expect the New Essays of my Lord Chancellor Bacon, as also his History, with a great deal of Desire, and whatsoever else he shall compose. But in Particular of his History, I promise myself a thing perfect and Singular; especially in Henry the Seventh; Where he may exercise the Talent of his Divine understanding. This Lord is more and more known, and his Books here, more and more delighted in; And those Men that have more than ordinary Knowledge in Humane affairs, esteem him one of the most capable Spirits of this Age; and he is truly such. Now his Fame doth not decree with Days since, but rather increase. Divers of his Works have been anciently, and yet lately, translated into other Tongues, both Learned and Modern, by Forraign Pens. Several Persons of Quality, during his Lordship's Life, crossed the Seas on purpose to gain an Opportunity of seeing him, and Discoursing with him: whereof one,
carried his Lordships Picture, from Head to Foot, over with him into France; as a Thing which, he foresaw, would be much desired there; That so they might enjoy, the Image of his Person, as well as the Images of his Brain, his Books. Amongst the rest, Marquis Fiat, a French-Noblemen; who came Ambassador into England, in the beginning of Queen Mary, Wife to King Charles, was taken with an extraordinary Desire of Seeing him: For which, he made way by a Friend: And when he came to him, being then, through weakness, confined to his Bed; The Marquis saluted him with this High-Expression; That his Lordship, had been ever to Him, like the Angels; of whom he had often heard, and read much of them in Books; But he never saw them. After which they contracted an intimate Acquaintance; And the Marquis did so much reverence him; that besides his Frequent visits; they wrote Letters, one to the other, under the Titles and Appellations, of Father and Son: As for his many Salutations, by Letters from Foreign Worthies, devoted to Learning; I forbear to mention them; Because that is a Thing common to other Men of Learning, or Note together with him.

But yet, in this Matter of his Fame, I speak, in the Comparative, only, and not in the Exclusive. For his Reputation is great, in his own Nation, also; Especially amongst those, that are of a more Acute, and shaper Judgement: Which I will exemplifie, but with two Testimonies, and no more. The Former; When his History of King Henry the Seventh was to come forth; It was delivered to the old Lord Brook, to be perused by him; who, when he had dispatched it, returned it to the Author, with this Eulogy: Commend me to my Lord, and bid him take care, to get good Paper and Inke, for the Work is incomparable. The other shall be that, of Doctor Samuel Collins, late Provost, of Kings Colledge, in Cambridge, A Man of no vulgar Wit, who affirmed unto me, That when he had read, the Book of the Advancement of Learning, He found himself in a case to begin his Studies a new, and that he had lost all the Time of his studying before.
It hath been desired; That something should be signified, touching his Diet; and the Regiment of his Health: Of which, in regard, of his Universal Inslight into Nature, he may (perhaps,) be to some, an Example. For his Diet; it was rather a plentiful; and liberal, Diet, as his Stomach would bear it, then a Reftrained; Which he also commended in his Book of the History of Life and Death. In his younger years, he was much given to the Finer and Lighter sort of Meats, as of Fowles; and such like: But afterward, when he grew more judicious; He preferred the stronger Meats; such as the Shambles afforded; As those Meats, which breed the more firm and substantial Juyces of the Body, and less Dilipable: upon which, he would often make his Meal; Though he had other Meats, upon the Table. You may be sure; He would not neglect that Himself, which He so much extolled in his Writings; And that was the Use of Nitric: Whereof he took in the Quantity of about three Grains, in thin warm Broath, every Morning, for thirty years together, next before his Death. And for Physick, he did, indeed, live Physically, but not miserably; For he took only a Maceration of Rhubarb; Infused into a Draught of White Wine, and Beer, mingled together, for the Space of half an Hour; Once in six or seven Days; Immediately before his Meal, (whether Dinner, or Supper,) that it might dry, the Body, lest what (as he said,) did carry away frequently, the Groffer Humours of the Body, and not diminish, or carry away, any of the Spirits, as Sweating doth. And this was no Grievous Thing to take. As for other Physick, in an ordinary way, (whatever hath been vulgarly spoken;) he took not. His Receipt, for the Gout, which did, constantly, ease him of his Pain, within two Hours, Is already set down in the End of the Natural History.

It may seem, the Moon, had some Principal Place, in the Figure of his Nativity. For the Moon, was never in her Passion or Eclipsed, but he was surprized, with a sudden Fit, of Fainting: And that, though he observed not, nor took any previous Knowledge, of the Eclipses thereof; and assoon as the Eclipse ceased, he was restored, to his former Strength again.
He died, on the 9th. Day of April, in the year 1626; In the early Morning, of the Day then celebrated for our Saviour's Resurrection, In the 66th. year of his Age; at the Earle of Arundells House in High-gate, near London; To which Place, he casually repaired, about a week before, God so ordaining, that he should dye there, Of a Gentle Fever, accidentally accompanied, with a great Cold; whereby the Defluxion of Rheume, fell so plentifully upon his Breast, that he died by Suffocation: And was buried, in Saint Michael's Church, at Saint Albans; Being the Place, designed for his Burial, by his last Will, and Testament; Both because the Body of his Mother was interred there; And because, it was the only Church, then remaining, within the Precincts of old Verulam: Where he hath a Monument, erected for him of White Marble; (By the Care, and Gratitude, of Sir Thomas Meautys, Knight, formerly his Lordships Secretary; Afterwards Clark of the Kings Honourable Privy Gounel, under two Kings:) Representing his full Portraiture in the Posture of Studying; with an Inscription composed by that Accomplish Gentleman, and Rare Wit, Sir Henry Wotton. 

But howsoever his Body was Mortal; yet no doubt his Memory and Works will live; And will in all probability, last as long as the World lasteth. In order to which, I have endeavoured, (after my poor Ability,) to do this Honour to his Lordship by way of enduring to the same.
NEW

ATLANTIS.

A Work unfinished.

Written by the Right Honorable;

FRANCIS

Lord Verulam, Viscount St. Albans.
TO THE 
READER.

His Fable my Lord devised, to the end that he might exhibit therein a Model or Description of a College, instituted for the Interpreting of Nature, and the producing of great and marvellous Works for the benefit of Men, under the name of Solomons House, or, The College of the Six days Works. And even so far his Lordship hath proceeded as to finish that Part. Certainly, the Model is more vast and high, than can possibly be imitated in all things, notwithstanding most things therein are within Mens power to effect. His Lordship thought also in this present Fable to have composed a Frame of Laws, or of the best State or Mould of a Commonwealth; but fore-seeing it would be a long Work, his desire of Collecting the Natural History diverted him, which he preferred many degrees before it.

This Work of the New Atlantis (as much as concerneth the English Edition) his Lordship designed for this place, in regard it hath so near affinity (in one part of it) with the preceding Natural History.

W. Rawley.

A 2
NEW
NEW ATLANTIS.

E failed from Peru (where we had continued by the space of one whole year) for China and Japan by the South Sea, taking with us Victualls for twelve Months, and had good Winds from the East, though soft and weak, for Five Moneths space and more; but then the Wind came about, and fetched in the West for many days; so as we could make little or no way, and were sometimes in purpose to turn back: But then again, there arose strong and great Winds from the South, with a Point East, which carried us up (for all that we could do) towards the North; by which time our Victualls failed us, though we had made good spare of them: So that finding our selves in the midst of the greatest Wilderness of Waters in the World, without Victual, we gave ourselves for lost men, and prepared for death. Yet we did lift up our hearts and voices to God above, Who sheweth his wonders in the deep; beseeching him of his mercy, That as in the Beginning he discovered the Face of the deep, and brought forth dry land's so he would now discover Land to us, that we might not perish. And it came to pass, that the next day about Evening, we saw within a Kenning before us, towards the North, as it were thicker Clouds, which did put us in some hope of Land; knowing how that part of the South-Sea was utterly unknown, and might have Islands or Continents that hitherto were not come to light. Wherefore we bent our course thereby, where we saw the appearance of Land all that night; and in the dawning of the next day, we might plainly discern that it was a Land flat to our sight, and full of Bofcage, which made it shew the more dark; and after an hour and a halfs failing, we entered into a good Haven, being the Port of a fair City, not great indeed, but well built, and that gave a pleasant view from the Sea: And we thinking every minute long, till we were on Land, came close to the Shore and offered to land; but straightways we saw divers of the people with Buttons in their hands, (as it were) forbidding us to land, yet without any cries or fierceenes, but only as warning us off by signs that they made. Whereupon being not a little dis comforted, we were advising with our selves, what we should do. During which time, there made forth to us a small Boat with about eight persons in it, whereof one of them had in his hand a Top-staff of a Yellow Cane, tipped at both ends with Blew, who made aboard our Ship without any shew of distrust at all: And when he saw one of our number present himself somewhat afore the rest, he drew forth a little Scroll of Parchment (somewhat yellower then our Parchment,
and thinking like the Leaves of Writing-Tables, but otherwise lost and flexible) and delivered it to our foremost man. In which Scroul were written in ancient Hebrew, and in ancient Greek, and in good Latin of the School, and in Spanish, these words, "Land ye not, none of you, and provided to be gone from this Coast within sixteen days, except you have further time given you: Mean while, if you want Fresh-water or Vegetal, or help for your Sick, or that your Ship needs repair, write down your wants, and you shall have that which belongeth to Mercy. This Scroul was signed with a stamp of Cherubins Wings, not spred, but hanging downwards, and by them a Cross. This being delivered, the Officer returned, and left one of a Servant with us to receive our answer. Consulting hereupon amongst our selves, we were much perplexed. The denial of Landing, and haftly warning us away, troubled us much. On the other side, to finde that the people had Languages, and were so full of Humanity, did comfort us not a little; and above all, the Sign of the Cross to that Instrument, was to us a great rejoicing, and, as it were, a certain presage of good. Our answer was in the Spanish Tongue, "That for our Ship it was well, for we had rather met with Calms and contrary Winds then any Tempefts. For our Sick, they were many, and in very ill case; so that if they were not permitted to land, they ran in danger of their lives. Our other wants we set down in particular, adding, "That we had some little store of Merchandize, which if it pleased them to deal for, it might supply our wants without being chargeable unto them. We offered some reward in Platoflets unto the Servant, and a piece of Crimson Velvet to be presented to the Officer: but the Servant took them not, nor would scarce look upon them, and so left us, and went back in another little Boat which was sent for him.

About three hours after we had dispatched our Answer, there came towards us a person (as it seemed) of place: He had on him a Gown with wide Sleeves of a kind of Water-Chamolet, of an excellent Azure colour, far more glosie then ours; his under apparel was green, and so was his Hat, being in the form of a Turban, daintily made, and not so huge as the Turkish Turbans; and the Locks of his Hair came down below the brims of it: A Reverend Man was he to behold. He came in a Boat gilt in some part of it, with four persons more onely in that Boat, and was followed by another Boat wherein were some twenty. When he was come within a sight-shot of our Ship, signs were made to us, that we should send forth some to meet him upon the Water; which we presently did in our Ship-boat, sending the principal Man amongst us tace one, and four of our number with him. When we were come within six yards of their Boat, they called to us to stay, and not to approach further; which we did. And thereupon the Man whom I before described stood up, and with a loud voice in Spanish, asked, Are ye Christians? We answered, Yes were; fearing the less, because of the Cross we had seen in the Subscription. At which answer, the Said person lift up his right hand towards Heaven, and drew it softly to his mouth, (which is the gesture they use when they thank God) and then said, "If ye will live (all of you) by the Merits of the Saviour, that ye are no Pirates, nor have shed blood, lawfully nor unlawfully, vizibh forty days past, you may have License to come on Land. We said, "We were all ready to take that Oath. Whereupon one of those that were with him, being (as it seemed) a Rotary, made an Entry of this Act. Which done, another of the attendants of the Great Person, which was with him
him in the same Boat, after his Lord had spoken a little to him, said aloud, "My Lord, would have you know, that it is not of Pride or Greames that he cometh not aboard your Ship; but for that, in your Answer, you declare, That you have many sick amongst you, he was warned by the Consul, or of Health of the City, that he should keep a distance. We bowed ourselves towards him, and answered, "We were his humble Servants, and accounted for great Honor and singular Humanity towards us, that which was already done; but hoped well, that the nature of the sickness of our Men was not infectious. So he returned, and a while after came the Notary to us aboard our Ship, holding in his hand a Fruit of that Country like an Orange, but of colour between Orange-lamy and Scarlitas, which caft a most excellent Odor: He used it (as it seemeth) for a Preventive against Infection. He gave us our Oath, By the Name of Jesus, and his Merits; and after told us, that the next day by six of the clock in the morning we should be sent to, and brought to the Strangers Houfe, (so he called it) where we should be accommodated of things both for our whole and for our sick. So he left us; and when we offered him some Piftollets, he smiling, said, He might or twice paid for one labor, meaning (as I take it) that he had salary sufficient of the State for his service; for (as I after learned) they call an Officer that taketh rewards, Twice paid.

The next morning early, there came to us the fame Officer that came to us at first with his Cane, and told us, "He came to conduct us to the Strangers Houfe, and that he had prevented the hour, because we might have the whole day before us for our business: For (said he) if you will follow my advice, there shall first go with me some fevv of you, and see the place; and how it may be made commodious for you; and then you may fend for your sick, and the rest of your number which ye will bring on Land. We thanked him, and said, "That this care which he took of detolerate Strangers, God would reward, And so six of us went on Land with him; and when we were on Land, he went before us, and turned to us, and said, He was but our Servant, and our Guide. He led us through three fair Streets, and all the way went there were gathered some people on both fides, standing in a row, but in so civil a fashion, as if it had been not to wonder at us, but to welcome us; and divers of them, as we passed by them, put their arms a little abroad, which is their gesture when they bid any welcome. The Strangers Houfe is a fair and spacious Houfe, built of Brick, of some what a bluer colour then our Brick, and with handsome Windows, some of Glas, some of akinde of Cambrick oiled. He brought us first into a fair Parlor above-stairs, and then asked us, "What number of persons we were, and how many sick. We answered, "We were in all (sick and whole) One and fifty persons, whereof our sick were seventeen." He desired us to have patience a little, and to stay till he came back to us, which was about an hour after; and then he led us to see the Chambers which were provided for us, being in number Nineteen. They have caft it (as it seemeth) that four of those Chambers, which were better then the rest, might receive four of the principal men of our company, and lodge them alone by themselves; and the other fifteen Chambers were to lodge us, two and two together; the Chambers were handsomely and cheerfull Chambers, and furnished civilly. Then he led us to a long Gallery, like a Dorture, where he shewed us all along the one side (for the other side was but Wall and Window) seventeen Cells, very neat and ones, having Partitions of Cedar-wood. Which Gallery and Cells, being in
New Atlantis.

all forty, (many more then we needed, were instituted as an Infirmary for sick persons. And he told us withal, that as any of our sick waxed well, he might be removed from his Cell to a Chamber; for which purpose, there were let forth ten spare Chambers, besides the number we spake of before. This done, he brought us back to the Parlor, and lifting up his Cane a little (as they do when they give any charge or command), said to us, "Ye are to know, that the Custom of the Land requireth, that after this day and to morrow (which we give you for removing your People from your Ship) you are to keep within doors for three days: But let it not "trouble you, nor do not think your selves restrained, but rather left to "your Rest and Ease. You shall want nothing, and there are six of our "people appointed to attend you for any business you may have abroad. We gave him thanks with all affection and respect, and said, God surely is manifested in this Land. We offered him also twenty Pitholets; but he smiled, and onely said, 'What, twice paid? and do he left us. Soon after our Dinner was served in, which was right good Viands, both for Bread and Meat, better then any Collegiate Diet, that I have known in Europe. We had also drink of three sorts, all wholesome and good; Wine of the Grape, a Drink of Grain, such as is with us our Ale, but more clear; and a kinde of Sider made of a Fruit of that Countrey, a wonderful pleasing and re-freshing drink. Besides, there were brought in to us great store of those Scarlet Oranges for our sick, which (they said) were an allured remedy for sicknes taken at Sea. There was given us also a Box of small grey or whitish Pills, which they wish'd our sick should take, one of the Pills every night before sleep, which (they said) would haften their recovery. The next day, after that our trouble of carriage and removing of our Men and Goods out of our Ship, was somewhat fled and quiet, I thought good to call our company together, and when they were assembled, said unto them, 'My dear Friends, let us know our selves, and how it standeth "with us.' We are Men call on Land, as Jonas was out of the VWhales "Belly, when we were as buried in the deep; and now we are on Land, "we are but between Death and Life, for we are beyond both the Old "VWorld and the New, and whether ever we shall see Europe, God only "knoweth: It is a kinde of miracle hath brought us hither, and it must be "little lesst that shall bring us hence. Therefore in regard of our delivery "ance past, and our danger present and to come, let us look up to God, "and every man reform his own ways. Besides, we are come here amongst "a Christian People, full of Piety and Humanity; let us not bring that con- "fusion of face upon our selves, as to shew our vices or unworthiness be- "fore them. Yet there is more; for they have by commandment (though "in form of courteous) cloistered us within thee VWalls for three days; "who knowveth whether it be not to take some taste of our manners and "conditions; and if they finde them bad, to banish us straight-vways; if "good, to give us further time? For these men that they have given us for "attendance, may vwitihal have an eye upon us. Therefore for Gods love, "and as we love the vveal of our Souls and Bodies, let us lo behave our "selves as we 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 admoition, and promised me to live soberly and civilly, and vwithout giving any the least occasion of offence. So we spent our three days joyfully and without care, in expectation what would be done with us when they were expired: During which time, we had every hour joy of
of the amendment of our sick, who thought themselves call into some divine Pool of Healing, they mended so kindly and so fast.

The morrow after our three days were past, there came to us a new Man that we had not seen before, clothed in blew as the former was, five that his Tunicant was white with a small Red Cross on the top of the Tipper of fine Linnen. At his coming in he did bend to us a little, and put his arms abroad. Of our parts finured him in a very lowly and submissive manner, as looking, that from him we should receive sentence of Life or Death. He desired to speak with some few of us while upon six of us only stood, and the rest avoided the room. He said, "I am office Governor of this House of Strangers, and by Vocation I am a Christian Priest; and therefore am come to you to offer you my service, both as Strangers, and chiefly as Christians. Some things I may tell you, which I think you will not be unwilling to hear. The State hath given you licence to stay on Land for the space of six weeks; and let it not trouble you, if your occasions ask further time, for the Law in this Point is not precise; and I do not doubt, but my tell shall be able to obtain for you such further time as shall be convenient. Ye shall also understand, that the Strangers House is at this time rich and much aforesaid, for it hath laid up Revenue these Thirty seven years; for so long it is since any Stranger arrived in this part: And therefore take ye no care, the State will defray you all the time you stay, neither shall you lay one day less for that. As for any Merchandize you have brought, ye shall be well used, and have your Return, either in Merchandize, or in Gold and Silver; for so is it all one. And if you have any other request to make, hide it not, for ye shall send we will not make your countenance to fall by the answer ye shall receive. Only this I must tell you, that none of you must go above a Karun (that is with them a mile and an half) from the Walls of the City without special leave. We answered, after we had looked a while upon one another, admitting this gracious and parent-like usage, "That we could not tell what to say, for we wanted words to express our thanks, and his noble free offers left us nothing to ask. It seemed to us, that we had before us a Picture of our Salvation in Heaven: for we that were a while since in the Jaws of Death, were now brought into a place where we found nothing but Consolations. For the Commandment laid upon us, we would not fail to obey it, though it was impossible but our hearts should be inflamed to tread further upon this happy and holy Ground. We added, "That our Tongues should first cleave to the Roots of our Months, ere we should forget either this Reverend Person, or this whole Nation, in our Prayers. We also most humbly besought him to accept of us as his true Servants, by as just a right as ever Men on Earth were bounden, laying and presenting both our persons and all we had at his feet. He said, "He was a Priest, and looked for a Priest's reward, which was our Brotherly love, and the good of our Souls and Bodies. So he went from us, not without tears of tenderness in his eyes; and left us also confounded with joy and kindness, saying amongst our selves, That we were come into a Land of Angels, which did appear to us daily, and present us with comforts which we thought not of, much less expected.

The next day about ten of the clock the Governor came to us again, and after salutations, said familiarly, "That he was come to visit us, and called for a Chair, and set him down; and we being ten men of us (the rest were of the meaner sort, or else gone abroad) set down with him: And when we were set, he began thus, "We of this Island of BenSalem (for so they call it in their
New Atlantis.

...have this: That by means of our solitary situation, and of the Laws of Secrecy which we have for our Travellers, and our rare admission of strangers, we know well most part of the Habitable World, and are our selves unknown. Therefore, because he that knoweth least, is fittest to ask Questions, it is more reafon, for the entertainment of the time, that ye ask me Questions, than that I ask you. We answered, That we humbly thanked him, that he would give us leave to do, and that we conceived by the tale we had already, that there was no worldly thing on Earth, more worthy to be known, than the State of that happy Land. But above all (we said) since that we were met from the several Ends of the World, and hoped assuredly, that we should meet one day in the Kingdom of Heaven, (for that we were both parts Christians) we desired to know, in respect that Land was so remote, and to divide by vall and unknown Seas, from the Land where our Saviour walked on Earth; who was the Apostle of that Nation, and how it was converted to the Faith. It appeared in his face, that he took great contentment in this our Question. He said, "Ye knitt my heart to you by asking this Question in the right place, for it sheweth that you first seek the Kingdom of Heaven; and I shall gladly and briefly satisfy your demand.

About twenty years after the Ascension of our Saviour, it came to pass, that there was seen by the people of Renvyle (a City upon the Eastern Coast of our Island) within night (the night was cloudy and calm) as it might be some mile in the Sea, a great Pillar of Lights, not sharp, but in form of a Column or Cylinder, rising from the Sea a great way up towards Heaven, and on the top of it was seen a large Cross of Lights, more bright and resplendent than the Body of the Pillar: Upon which it strange a spectacle the people of the City gathered apiece together upon the Sands to wonder, and so after put themselves into a number of small Boats to go nearer to this marvellous sight. But when the Boats were come within (about) sixty yards of the Pillar, they found themselves all bound, and could go no further, yet so as they might move to go about, but might not approach nearer; so as the Boats stood all as in a Theatre, beholding this Light as an Heavenly Sign. It fell out, that there was in one of the Boats, one of the wise Men of the Society of Salomons House, (which House or College (my good Brethren) is the very Eye of this Kingdom) who having a while attentively and devoutly viewed and contemplated this Pillar and Cross, fell down upon his face, and then raised himself upon his knees, and lifting up his hands to Heaven made his Prayers in this manner.

LORD God of Heaven and Earth, thou hast vouchsafed of thy Grace to those of our Order, to know thy Works of Creation, and true Secrets of them, and to discern (as far as appertaineth to the Generations of Men) between Divine Miracles, Works of Nature, Works of Art, and Impostures and Illusions of all sorts. I do here acknowledge and testify before this People, that the Thing
we now see before our eyes is thy Finger, and a true Miracle. And forasmuch as we learn in our Books, that thou never workest Miracles but to a Divine and excellent End, (for the Laws of Nature, are thine own Laws, and thou exceedest them not but upon good cause) we most humbly beseech thee to prosper this great Sign, and to give us the Interpretation, and use of it in mercy, which thou dost in some part secretly promise, by sending it unto us.

"When he had made his Prayer, he presently found the Boat: he was in, moveable and unbound, whereas all the rest remained still fast; and taking that for an assurance of leave to approach, he caused the Boat to be ordinarily, and with silence, rowed towards the Pillar: but ere he came near it, the Pillar and Cross of Light brake up, and called it self abroad, as it were, into a Firmament of many Stars; which also vanished soon after, and there was nothing left to be seen but a small Ark of Cedar, dry, and not wet at all with Water, though it swam; and in the fore end of it, which was towards him, grew a small green Branch of Palm. And when the Wise-man had taken it with all reverence into his Boat, it opened of itself, and there was found in it a Book and a Letter, both written in fine Parchment, and wrapped in Sindons of Linnen. The Book contained all the Canonical Books of the Old and New Testament, according as you have them, (for we know well what the Churches with you receive;) and the Apocalypse itself, and some other Books of the New Testament, which were not at that time written, were nevertheless in the Book. And for the Letter, it was in these words.

I Barholomew, a Servant of the Highest, and Apostle of JESUS CHRIST, was warned by an Angel that appeared to me in a Vision of Glory, that I should commit this Ark to the Flouds of the Sea. Therefore I do testify and declare unto that People, where GOD shall ordain this Ark to come to Land, that in the same day is come unto them Salvation, and Peace, and Good Will from the FATHER, and from the LORD JESUS.

"There was also in both these Writings, as well the Book as the Letter, wrought a great Miracle, conform to that of the Apostle in the Original Gift of Tongues. For there being at that time in this Land Hebrews, Persians, and Indians, besides the Natives, every one read upon the Book, and
and Letter, as if they had been written in his own Language. And thus was this Land faved from Infidelity (as the Remain of the old World was from Water) by an Ark, through the Apoftolical and Miraculous Evangelism of S. Bartholomew. And here he paused, and a Messenger came and called him forth from us. So this was all that passed in that Conference.

The next day the same Governor came again to us immediately after Dinner, and excused himself, saying, "That the day before he was called from us somewhat abruptly, but now he would make us amends, and spend time with us, if we held his Company and Conference agreeable. We answered, "That we held it to agreeable and pleasing to us, as we forgot both dangers past and fears to come, for the time we heard him speak, and that we thought an hour spent with him, was worth years of our former life. He bowed himself a little to us, and after we were set again, he said, "Well, the Questions are on your part. One of our number said, after a little pause, "That there was a matter we were no les desirous to know then fearful to ask, lest we might presume too far; but encouraged by his rare Humanity towards us, "(that could scarce think our selves strangers, being his vowed and professed Servants) we would take the hardiness to propound it: Humbly beseeching him, if he thought it not fit to be answered, that he would pardon it, though he rejected it. "We said, We well observed those his words which he formerly spake, That this happy Island where we now stood was known to few, and yet knew nolt 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 Business; and yet we in Europe (notwithstanding all the remote Discoveries and Navigations of this late Age) never heard any of the least Inking or Glimpse of this Island. This we found vvonderful strange, for that all Nations have interknowledge of one another, either by Voyage into Forein Parts, or by Strangers that come to them: And though the Traveller into a Forein Country, doth commonly know more by the Eye, then he that liad at home can by relation of the Traveller; yet both ways suffice to make a mutual knowledge in some degree on both parts: But for this Island, we never heard tell of any Ship of theirs that had been seen to arrive upon any Shore of Europe, no nor of either the East or West-Indies, nor yet of any Ship of any other Part of the World that had made return for them. And yet the marvel rested not in this; for the situation of it (as his Lordship said) in the secret Conclave of such a vast Sea might cause it; But then, that they should have knowledge of the Languages, Books, Affairs of those that lie such a distance from them, it was a thing we could not tell what to make of; for that it seemed to us a condition and propriety of Divine Powers and Beings, to be hidden and unseen to others, and yet to have others open, and as in a light to them. At this Speech the Governor gave a gracious smile, and said, "That we did well to ask pardon for this Question we now asked, for that it importes as if we thought this Land, a Land of Magicians, that lent forth Spirits of the Air into all parts to bring them news, and intelligence of other Countreys. It was answered by us all, in all possible humility; but yet with a countenance taking knowledge, that we knew, that he spake it but merily, "That we were apt enough to think, there was somewhat supernatural in this Island, but yet rather as Angelical then Magical. But to let his Lordship know truly what it was that made us tender and doubtful to ask this Question,
Questian: it was not any such conceit, but because we remembered he had given a touch in his former Speech, that this Land had Laws of Secrecy, touching Strangers. To this he said, "You remember it right; and therefore in that, I shall say to you, I must reserve some particulars which it is not lawful for me to reveal, but there will be enough left to give you satisfaction.

"You shall understand (that which perhaps you will scarce think credible) that about Three thousand years ago, or somewhat more, the Navigation of the World (specially for remote Voyages) was greater then at this day. Do not think with yourselves, that I know not how much it is increased with you within these three-score years, I know it well; and yet I say, greater then then now. Whether it was, that the example of the Ark that saved the remnant of Men from the Universal Deluge gave men confidence to adventure upon the Waters, or what it was, but such is the truth. The Phoenicians, and specially the Tyrians, had great Fleets; so had the Corinthians their Colony, which is yet further West: Toward the East, the Shipping of Egypt and of Palestine was likewise great; China also, and the Great Atlantus (that you call America) which have now but Junkes and Canoes, abounded then in tall Ships. This Island (as appeared by faithful Registries of those times) had then Fifteen hundred strong Ships of great content. Of all this, there is with you sparing memory for none, but we have large knowledge thereof.

"At that time this Land was known, and frequented by the Ships and Vessels of all the Nations beforenamed, and (as it cometh to pass) they had many times Men of other Countreys that were no Sailers, that came with them, as Persians, Chaldeans, Arabians; so as almost all Nations of might and name courted him, of whom we have some Strips and little Tribes with us at this day. And for our own Ships, they went sundry Voyages, as well to your streights, which you call the Pillars of Hercules, as to other parts in the Atlantic and Mediterranean Seas; as to Egyptian (which is the same with Cambia) and Quinsay upon the Oriental Sea, as far as to the Borders of the East Interpreter.

"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, of the Descendents of Neptune planted there, and of the magnificent Temple, Palace, City, and Hill, and the manifold streams of Goodly Navigable Rivers, which (as so many Chains) invironed the same Site and Temple, and the several degrees of ascent, whereby men did climb up to the same, as if it had been a Scala Caeli, be all Poetical and Fabulous; yet so much is true. That the said Countrey of Atlantis, as well that of Peru then called Clys, as that of Mexico then named Tyrambel; were mighty and proud Kingdoms in Arms, Shipping, and Riches; so mighty, as at one time (or a leaf with in the space of ten years) they both made two great expeditions, they of Tyrambel through the Atlantic to the Mediterranean Seas, and they of Clys through the South-Sea upon this our Island. And for the former of these, which was into Europe, the same Author amongst you (as it seemeth) had some relation from the Egyptian Priest whom he citeth, for assuredly such a thing there 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 certain it is, there never came back either Ship or Man from that Voyage. Neither had the other Voyage of those of Clys, upon us, had better fortune,
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 Warrior, "knowing well both his own strength, and that of his enemies, handled the "matter so, as he cut off their Land forces from their Ships, and entailed "both their Navy and their Camp, with a greater power than theirs, both "by Sea and Land, and compelled them to render themselves without "striking stroke; and after they were at his mercy, contenting himself one- "ly with their Oath, that they should no more bear Arms against him, dis- "missed them all in safety. But the Divine revenge overtook not long "after those proud enterprizes; for within less then the space of One hun-

red years the Great Atlantic was utterly lost and destroyed, not by a great "Earthquake, as your Man faith, (for that whole Tract is little subject to "Earthquakes) but by a particular Deluge or inundation, those Countreys "having at this day far greater Rivers, and far higher Mountains to pour "down Waters, than any part of the Old World. But it is true, that the "time Inundation was not deep, not past forty foot in most places from "the ground; so that although it destroyed Man and Beall generally, "yet some few wilde Inhabitants of the Wood escaped: Birds also were "fav'd 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 VWater; "yet that Inundation, though 'twas 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 marvel you not at the thin Popu-

lation of America, nor at the Rudeness and Ignorance of the People; for "you must account your Inhabitants of America as a young People, "younger a thousand years at the least than the rest of the World, for "that there was so much time between the Universal Flood, and their par-

ticular Inundation. For the poor remnant of Humane Seed which re-

maind in their Mountains peopled the Countrey again slowly, by little "and little: And being simple and a savage people (not like Noah and his "Sons, which was the chief Family of the Earth) they were not able to "leave Letters, Arts, and Civility to their Posterity. And having likewise "in their Mountainous Habitations been used (in respect of the extreme "Cold of those Regions) to cloath themselves with the skins of Tigers, "Bees, and great Hairy Goats, that they have in those parts; when after "they came down into the Valley, and found the intolerable Heats which "are there, and knew no means of lighter Apparel, they were forced to "begin the custom of going naked, which continueth this day; onely "they take great pride and delight in the Feathers of Birds: And this also "they took from those their Ancestors of the Mountains, who were in-

vited unto it by the infinite flight of Birds that came up to the high "Grounds, while the Waters stood below. So you see by this main "accident of time, we lost our Traffick with the Americans, with whom, "of all others, in regard they lay nearest to us, we had most commerce: "As for the other parts of the World, it is most manifest, that in the "Ages following (whether it were in respect of Wars, or by a Natural "revolution of time) Navigation did every where greatly decay, and "especially far voyages (the rather by the use of Gallies, and such Vessels "as could hardly break the Ocean) were altogether left and omitted. "So then, that part of enterprize which could be from other Nations "to fall to us, you see how it hath long since ceased, except it were by "some rare accident, as this of yours. But now of the cessation of that "other
There reigned in this Island about one thousand nine hundred years ago, a King, whose memory of all others we most adore, mortification, but as a Divine Instrument, though a Mortal Man; his name was Solomon, and we esteem him as the Law-giver of our Nation. This King had ample heart insurmountable for good, and was wholly bent to make his Kingdom and People happy: He therefore taking into consideration, how sufficient and substantial this Land was to maintain itself without any aid (at all) of the Foreigner, being five thousand six hundred miles in circuit, and of rare fertility of soil in the greatest part thereof; and finding all the shipping of this Country might be plentifully set on work, both by Fishing, and by Transportations from Port to Port, and likewise by failing unto some small Islands that are not far from us, and are under the Crown and Laws of this State; and recalling into his memory the happy and flourishing state wherein this Land then was, so as it might be a thousand ways altered to the worse, but fear no one way to the better; thought nothing wanted to his Noble and Heroical Intentions, but only (as far as Human foresight might reach) to give perpetuity to that which was in his time so happily established; therefore amongst his other Fundamental Laws of this Kingdom, he did ordain the Interdicts and Prohibitions which we have touching entrance of strangers, which at that time (though it was after the calamity of America) was frequent, doubting novelities and commixture of manners. It is true, the like Law against the admission of strangers, without licence, is an ancient Law in the Kingdom of China, and yet continued in use; but there it is a poor thing, and hath made them a curious, ignorant, fearful, foolish Nation. But our Law-giver made his Law of another temper. For first, he hath preferred all points of humanity, in taking order and making provision for the relief of strangers distressful, whereas if you have tafted. At which Speech (as reason was) we all rose up and bowed ourselves. He went on. "That King also still desiring to joyn Humanity and Policy together, and thinking it against Humanity to detain Strangers here against their Wills, and against Policy, that they should return and discover their knowledge of this State, he took this course. He did ordain, that of the Strangers that should be permitted to Land, as many (at all times) might depart as would, but as many as would stay, should have very good conditions and means to live from the State. Wherein he saw to far, that now in so many Ages, since the Prohibition, we have memory of not one. Ship that ever returned, and but of thirteen persons only at several times that chose to return in our Bottoms. What those few that returned, may have reported abroad, I know not; but you must think, whatsoever they have said, could be taken where they came, but for a dream. Now for our travelling from hence into parts abroad; our Law-giver thought fit altogether to restrain it. So is it not in China, for the Chinefs fail where they will, or can; which we see, that their Law of keeping our Strangers, is a Law of pusillanimity and fear. But this restrain of ours hath one only exception, which is admirable, preserving the good which commeth by communicating with strangers, and avoiding the hurt; and I will now open
open it to you. And here I shall seem a little to digress, but you will by "and by finde it pertinent. Ye shall understand (my dear Friends) that "amongst the excellent acts of that King, one above all hath the preemini- "nence: It was the erection and institution of an Order or Society which "we call Solomon Houfe, the noblest Foundation (as we think) that ever "was upon the Earth, and the Lanthorn of this Kingdom. It is dedicated "to the study of the Works and creatures of God. Some think it baredth "the Founders name a little corrupted; as if it should be Solomon Houfe; "but the Records write it as it is spoken, fo as I takke it to be denomini- "nate of the King of the Hebrews, which is famous with you, and no stranger "to us; for we have some parts of his Works which with you are lost, "namely, that Natural History which he wrote of all Plants, from the Cedar "of Libanus to the Moss that grows out of the Wall, and of all things that ve "Life and Motion. This maketh me think that our King finding himself to "symbolize in many things with that King of the Hebrews (which lived "many years before him) honored him with the Title of this Foundation. "And I am the rather induced to be of this opinion, for that I finde in an- "cient Records this Order or Society is sometimes called Solomon Houfe, "and sometimes the College of the Six days' Works; whereby I am satisfied, "that our Excellent King had learned from the Hebrews, that God had "created the World, and all that therein is within six days; and therefore "he instituting that Houfe for the finding out of the true Nature of all "things (whereby God might have the more glory in the workmanship of "them, and Men the more Fruit in their use of them) did give it also that "fame name. But now to come to our present purpose.

"When the King had forbidden to all his People Navigation in any "part that was not under his Crown, he made nevertheless this Ordinance, "That every twelve years there should be set forth out of this Kingdom "two Ships appointed to several Voyages; that in either of those Ships, "there should be a Mission of three of the Fellows or Brethren of Solomon "Houfe, whose errand was only to give us knowledge of the affairs and "state of those Countreys, to which they were designd, and especially of the "Sciences, Arts, Manufactures and Inventions of all the World; and withal "to bring unto us Books, Instruments, and Patterns in every kinde. That "the Ships after they had landed the Brethren should return, and that the "Brethren should stay abroad till the new Mission. The Ships are not other- "wise fraught than with Store of Victuals, and good quantity of Treasure, "to remain with the Brethren for the buying of such things; and rewarding "of such persons as they should think fit. Now for me to tell you how the "vulgar sort of Mariners are contained from being discoverd at Land, "and how they that must be put on shore for any time colour themselves "under the names of other Nations, and in what places these Voyages have "been designd, and what places of Rendezvous are appointed for the new "Missions, and the like circumstances of the practice. I may not do it, neither "is it much to your desire. But thus you see we maintain a Trade, not for "Gold, Silver, or Jewel, nor for Silks, nor for Spices, nor any other com- "modity of Matter, but one, for God's first Creature, which was Light; to "have Light (I say) of the growth of all parts of the World. And when he "had said this, he was silent, and lo were we all; for indeed, we were all astonish- "ed to hear so strange things so probably told. And he perceiving, that we "were willing to say somewhat, but had it not ready, in great courtsey, took us off, and descendd to ask us Questions of our Voyage and Fortunes; and
and in the end concluded, that we might do well to think with our selves what time of stay we would demand of the State, and had us not to scant our selves; for he would procure such time as we desired. Whereupon we all rose up and presented our selves to King of this Tipper, but he would not suffer us, and took his leave. But when it came once amongst our people, that the State used to offer conditions to strangers that would stay, we had work enough to get any of our men to look to our Ship, and to keep them from going presently to the Governor to crave conditions; but with much ado, we restrained them till we might agree what course to take.

We took our selves now for Freemen, seeing there was no danger of our utter perdition, and lived most joyfully, going abroad, and seeing what was to be seen in the City and places adjacent within our; and obtaining acquaintance with many of the City, not of the meanest quality, at whose hands we found such humanity, and such a freedom and desire to take strangers, as it were into their bosom, as was enough to make us forget all that was dear to us in our own Countreys, and continually we met with many things right worthy of observation and relation: As indeed, if there be a Mirror in the World, worthy to hold men's 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 natural, pious and reverend custom, shewing that Nation to be compounded of all good-nets. This is the manner of it. It is granted to any man that shall live to be thirty percents dependent of his body alive together, and all above three years old, to make this Feast, which is done at the cost of the State. The Father of the Family, whom they call the Tiffan, two days before the Feast taketh to him three of such Friends as he listeth to chuse, and is admitted also by the Governor of the City or place where the Feast is celebrated; and all the Persons of the Family of both Sexes are summoned to attend him. These two days the Tiffan meeteth in consultation concerning the good office of the Family; there, if there be any Discord or Suits between any of the Family, they are compounded and appeased; there, if any of the Family be disquieted or decayed, order is taken for their relief and competent means to live; there, if any be subject to vice or take ill courses, they are reproved and cashiered. So likewise, direction is given touching Marriages, and the courses of life which any of them should take; with divers other the like orders and advices. The Governor affilith to the end, to put in execution by his publick Authority, the Decrees and Orders of the Tiffan, if they should be disobeyed, though that seldom needeth; such reverence and obedience they give to the order of Nature. The Tiffan doth also then ever chuse one man from amongst his Sons to live in House with him, who is called ever after the Son of the Vine; the reason will hereafter appear. On the Feast day, the Taker or Tiffan cometh forth after Divine Service into a large Room where the Feast is celebrated; which Room hath an Half-pike at the upper end. Against the Wall, in the middle of the Halls, is a Chair placed for him, with a Table and Carpet before it. Over the Chair is a State made round or oval, and it is of Ivy; and lyv somewhat whiter then ours, like the Lea of a Silver Ap, but more shining, for it is Green all Winter. And the State is curiously wrought with Silver and Silk of divers colours, bridging or binding in the leys, and is ever of the work of some of the Daughters of the Family, and veiled...
over at the top with a fine Net of Silk and Silver: But the substance of it is true Ivy, whereof, after it is taken down, the Friends of the Family are desirous to have some Leaf or Sprig to keep. The Tifan cometh forth with all his Generation or Lineage, the Males before him, and the Females following him. And if there be a Mother, from whose body the whole Lineage is descended, there is a Traverfe placed in a Loft above on the right hand of the Chair, with a Prive Door, and a carved Window of Glass, leaded with Gold and Blew, where the fittest, but is not seen. When the Tifan is come forth, he sitteth down in the Chair, and all the Lineage place themselves against the Wall, both at his back, and upon the return of the Half-pace, in order of their years, without difference of Sex, and stand upon their Feet. When he is fet, the room being always full of company, but well kept, and without disorder, after some pause there cometh in from the lower end of the room a Tartan, (which is as much as an Herauld) and on either side of him two young Lads, whereof one carrieth a Scroll of their shining yellow Parchment, and the other a cluster of Grapes of Gold, with a long foot or stalk: The Herauld and Children are clothed with Mantles of Sea-water-green Satin, but the Heraulds Mantle is streamed with Gold, and hath a Train. Then the Herauld, with three Courteties, or rather Inclinations, cometh up as far as the Half pace, and there first taketh into his hand the Scroll. This Scroll is the Kings Charter, containing Gift of Revenue, and many Privileges, Exemptions, and Points of Honor granted to the Father of the Family; and it is ever filled and directed, To such an one, Our well-beloved Friend and Creditor, which is a Title proper onely to this case: For they say, the King is Debtor to no Man, but for propagation of his Subjects, The Seal set to the Kings Charter, is the Kings Image imbossed or moulded in Gold. And though such Charters be expedited of court, and as of right, yet they are varied by discretion, according to the number and dignity of the Family. This Charter the Herauld readeth aloud; and while it is read, the Father or Tifan standeth up, supported by two of his Sons, such as he chufeth. Then the Herauld mounteth the Halfpace, and delivereth the Charter into his hand, and with that there is an acclamation by all that are present in their Language, which is thus much, Happy are the People of Benfalem. Then the Herauld taketh into his hand from the other Chair the cluster of Grapes, which is of Gold, both the Stall and the Grapes; but the Grapes are daintily enameled: And if the Males of the Family be the greater number, the Grapes are enameled Purple, with a little Sun set on the top; if the Females, then they are enameled into a greenish yellow, with a Crescent on the top. The Grapes are in number as many as there are Descendants of the Family. This Golden Cluster the Herauld delivereth also to the Tifan, who presently delivereth it over to that Son that he had formerly chosen to be in house with him; who beareth it before his Father as an Ensign of Honor when he goeth in publick ever after, and is thereupon called The Son of the Vine. After this Ceremony ended, the Father or Tifan retireth, and after some time cometh forth again to Dinner, where he sitteth alone under the State as before; and none of his Descendants sit with him; of what degree or dignity soever, except he have to be of Solomon's House. He is served only by his own Children, such as are Male, who perform unto him all service of the Table upon the knee; and the Women only stand about him, leaning against the Wall. The Room below his Half pace
hath Tables on the sides for the GueLts that are bidden, who are served with great and comely order; and toward the end of Dinner (which in the greatest Feasts with them, lasteth never above an hour and a half) there is an Hymn sung, varied according to the Invention of him that composed it, (for they have excellent Poetie;) but the subject of it is (always) the praises of Adam, and Noah, and Abraham; whereas the former two people the World, and the last was the Father of the Faithful; concluding ever with a Thanksgiving for the Nativity of our Saviour, in whose Birth the Berths of all are onely Blessed. Dinner being done, the Tisfan retires again, and having withdrawn himself alone into a place, where he makes some private Prayers, he cometh forth the third time to give the Blessing with all his Defendents, who stand about him as at the first. Then he calleth them forth, by one and by one, by name, as he pleaseth, though seldom the order of age be inverted. The person that is called (the Table being before removed) kneeleth down before the Chair, and the Father layeth his hand upon his head, or her head, and giveth the Blessing in these words: Son of Benfalem (or Daughter of Benfalem) thy Father faith it, the Man by whom thou hast breath and life speaketh the word: The Blessing of the Ever-lifting Father, the Prince of Peace, and the Holy Dove be upon thee, and make the days of thy Pilgrimage good and many. This he faith to every of them; and that done, if there be any of his Sons of eminent Merit and Vertue, (to they be not above two) he calleth them forth again, and faith, laying his arm over their shoulders, they standing, Sons, it is well you are born; give God the praise, and persevere to the end. And withal delivereth to either of them a Jewel, made in the figure of an Ear of Wheat, which they ever after wear in the front of their Turban or Hat. This done, they fall to Musick and Dances and other Recreations after their manner for the rest of the day. This is the full order of that Feast.

By that time fix or seven days were spent, I was fallen into straight acquaintance with a Merchant of that City, whose name was Josan; he was a Jew, and circumcised: For they have some few slips of Jews yet remaining among them, whom they leave to their own Religion; which they may the better do, because they are of a far differing disposition from the Jews in other parts. For whereas they hate the Name of CHRIST, and have a secret inbred rancor against the people, among whom they live: These (contrariwise) give unto our Saviour many high Attributes, and love the Nation of Benfalem extremely. Surely this Man, of whom I speak, would ever acknowledge that CHRIST was born of a Virgin, and that he was more than a Man; and he would tell how GOD made him Ruler of the Seraphims, which guard his Throne; and they call him also the Milken way, and the Eliah of the Messiah, and many other high Names; which though they be inferior to his Divine Majesty, yet they are far from the Language of other Jews. And for the Countrey of Benfalem, this Man would make no end of commending it, being desirous, by Tradition among the Jews there, to have it believed, that the people thereof were of the Generations of Abraham by another Son, whom they call Nachor; and that Messiah by a secret Cabala ordained the Laws of Benfalem, which they now use; and that when the Messiah should come and sit in his Throne at Jerusalem, the King of Benfalem should sit at his Feet, whereas other Kings should keep a great distance. But yet setting aside these Jewish Dreams, the Man was a wise man and learned, and of great policy, and excellently seen in the Laws and Customs of that Nation.
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 Custom in holding the Feast of the Family, for that (me thought) I had never heard of a Solemnity wherein Nature did so much preside. And because Propagation of Families proceedeth from the Nuptial Copulation, I desired to know of him what Laws and Customs they had concerning Marriage, and whether they kept Marriage well, and whether they were tied to one Wife. For that where Population is so much affected, and such as with them it seemed to be, there is commonly permission of Plurality of Wives. To this he said, "You have reason to remark that excellent Institution of the Feast of the Family; and indeed we have experience, that those Families that are partakers of the bleffings of that Feast do flourish and prosper ever after in an extraordinary manner. But hear me now, and I will tell you what I know. You shall find, that there is not under the Heavens, so chaste a Nation as this of Benfalem, nor so free from all pollution or foulness; it is the Virgin of the World. I remember I have read in one of your European Books of an holy Hermit amongst you, that desired to see the Spirit of Fornication, and there appeared to him a little foul ugly Cerisy: But if he had desired to see the Spirit of Chastity of Benfalem, it would have appeared to him in the likeness of a fair beautiful Cherubin; for there is nothing amongst Mortal Men more fair and admirable, than the chaste Minds of this People. Know therefore, that with them there are no Bews, no dilholute Houses, no Courtefans, nor any thing of that kind; they wonder (with detestation) at you in Europe which permit such things. They say you have put Marriage out of office; for Marriage is ordained a remedy for unlawful concupiscence, and natural concupiscence seemeth as a spur to Marriage: But when Men have at hand a remedy more agreeable to their corrupt will, Marriage is alnoff expelled. And therefore, there are with you seen infinite Men that marry not, but chuse rather a Libertine, and impure single life, then to be yoaked in Marriage; and many that do marry, marry late, when the prime and strength of their years is past; and when they do marry, what is Marriage to them, but a very Bargain, wherein is fought Alliance, or Portion, or Reputation, with some desire (almost indifferent) of affue, and not the faithful Nuptial Union of Man and Wife that was first instituted? Neither is it possible, that those that have cast away so basely so much of their strength, should greatly esteem Children (being of the same matter) as such Men do. So likewise during Marriage, is the cafe much amended, as it ought to be, if those things were tolerated only for necessity? No, but they remain still as a very affront to Marriage; the hunting of those dilholute places, or resort to Courtefans, are no more punished in Married men, then in Batchelors; And the depraved custom of change, and the delight in meretricious embraces, (where Sin is turned into Art) maketh Marriage a dulle thing, and a kind of Impostion or Tax. They hear you defend these things as done to avoid greater evils, as Advowories, Disloiring of Virgins, Unnatural Lust, and the like: But they say this is a preposterous Wit dom; and they call it Laws offer, who to have his Guests from abusing offered his Daughters: Nay, they say further, that there is little gained in this, for that the same Vices and Appetites do still remain and abound, Unlawful Lust being like a Furnace, that if you stop the Flames altogether.
New Atlantis.

gather, it will quench but if you give it any vent, it will rage. As for
"Masculine Love, they have no touch of it; and yet there are not so faithful
ful and inviolate. Friendship is in the World again as are there; and to
speak generally (as I said before) I have not read of any such Chastity in
my People as theirs. And their usual saying is, That whosoever is unchaste,
cannot reverence himself. And they say, That the reverence of a Mans felt
is next Religion, the chiefest Brute of all Vices. And when he had said
this, the good Jov paused a little. Whereupon, I far more willing to hear
him speak on, than to speak my self; yet thinking it decent, that upon his
pause of Speech I should not be altogether silent, said only this. "That I
would say to him, as the Widow of Sarepta said to Elias, That he was
come to bring to memory ours; and that I confes the righteousness of
Benjamin was greater than the righteousness of Europe. As which Speech, he
bowed his Head, and went on in this manner. "They have also many wise and
excellent Laws touching Marriage; they allow no Polygamy; they have
ordained, that none do intermarry or contract until a moneth be past from
their first interview. Marriage without consent of Parents, they do not
make void, but they mulfet it in the Inheritors; for the Children of such
Marriages are not admitted to inherit above a third part of their
Inheritance. I have read in a Book of one of your Men, of a Feigned
Commonwealth, where the married couple are permitted before they
contract to be one another naked. This they dislike, for they think it a
scorn to give a resuall after so familiar knowledge; but because of many
hidden defects in Men and Women Bodies, they have a more civil way;
or they have near every Town, a couple of Pools (which they call
Adam and Eve Pools) where it is permitted to one of the Friends of the
Man, and another of the Friends of the Woman, to see them severally
bath naked.

And as we were thus in Conference, there came one that seemed to be
a Messenger, in a rich Hake, that spake with the Jov; whereupon he
turned to me, and said, You will pardon me, for I am commanded away in haste.
The next morning he came to me again, joyful, as it seemed, and said,
"There is word come to the Governor of the City, that one of the Fathers
of Solomon's House will be here this day seven-night; we have seen none of
them this dozen years." His coming is in haste, but the cause of his coming
is secret, I will provide you and your Fellows of a good standing to see
his entry. "I thanked him, and told him, I was glad of the news. The
day being come, he made his entry. He was a Man of middle stature and
age, comely of person; and had an aspect as if he pitied men: He was
cloathed in a robe of fine black Cloath, with wide Sleeves, and a Cape;
his under Garment was of excellent white Linnen down to the Foot,
girt with a Girdle of the fame, and a Sndon or Tippet of the fame about
his Neck; he had Gloves that were curious, and set with Stone; and Shooses
of Peach-coloured Velvet; his Neck was bare to the Shoulders; his Hair
was like a Helmet or Spanish Morcena, and his Locks curled below it de-
cently, they were of colour brown; his Beard was cut round, and of the
same colour with his Hair, somewhat lighter. He was carried in a rich
Chariot without Wheels, Litter-wise, with two Horses at either end,
richly trapped in blew Velvet embroidered, and two Footmen on each
side in the like attire. The Chariot was all of Cedar, gilt and adorned
with Crystal, save that the fore-end had Pannels of Saphires set in borders
of Gold, and the hinder-end the like of Emeralds of the Pern colour.
There
New Atlantis.

There was also a Sun of Gold, radiant upon the top in the midst; and on the top before a small Cherub of Gold, with Wings displayed. The Chariot was covered with Cloth of Gold ruffled upon blew. He had before him fifty attendants, young men all, in white Sutton loose Coats, up to the mid-leg, and Stockins of white Silk, and Shooes of blew Velvet, and Hats of blew Velvet, with fine Plumes of divers colours set round like Harbans. Next before the Chariot, went two men bare-headed, in Linnen Garments down to the Foot, gilt, and Shooes of blew Velvet, who carried, the one a Crofier, the other a Pastoral Staff like a Sheep-hook, neither of them of Metal, but the Crofier of Balm-wood, the Pastoral Staff of Cedar. Horsemen he had none, neither before, nor behind his Chariot, as it seemeth, to avoid all tumult and trouble. Behind his Chariot went all the Officers and Principals of the Companies of the City. He sat alone upon Cushions, of a kinde of excellent Plush, blew, and under his Foot curious Carpets of Silk of divers colours, like the Persian, but far finer. He held up his barehand as he went, as blessing the People, but in silence. The Street was wonderfully well kept, so that there was never any Army had their Men stand in better battel-array, then the people stood. The Windows likewise were not crowded, but every one stood in them, as if they had been placed. When the show was past, the very said to me, "I shall not be able to attend you as I would, in regard of some charge the City hath laid upon me for the enterraining of this great Person. Three days after the Jew came to me again, and said, "Ye are happy men, for the Father of Solomon's Housetaketh knowledge of your being here, and commanded me to tell you, that he will admit all your company to his presence, and have private conference with one or two that ye shall chuse; and for this, hath appointed the next day after to morrow. And because he meaneth to give you his Blessing, he hath appointed it in the forenoon. We came at our day and hour, and I was chosen by my fellows for the private access. We found him in a fair Chamber richly hanged, and carpeted under Foot, without any degrees to the State: He was set upon a low Throne, richly adorned, and a rich Cloth of State over his head of blew Satin embroidered. He was alone, save that he had two Pages of Honor on either hand one, finely attired in white. His under Garments were the like, that we saw him wear in the Chariot; but instead of his Gown, he had on him a Mantle with a Cape of the same fine Black, fastned about him. When we came in, as we were taught, we bowed low at our first entrance; and when we were come near his Chair, he stood up, holding forth his hand ungloved, and in posture of Blessing; and we every one of us flooped down and kissed the hem of his Tippet. That done, the rest departed, and I remained. Then he warned the Pages forth of the Room, and caused me to sit down beside him, and spake to methus in the Spanish Tongue.
"God Bless thee, my Son, I will give thee the greatest Jewel I have; for I will impart unto thee, for the love of God and Men, a Relation of the true state of Solomon's House. Son, to make you know the true state of Solomon's House, I will keep this order.

First, I will set forth unto you the End of our Foundation. Secondly, the Preparations and Instruments we have for our Works. Thirdly, the several Employments and Functions wheroeto our Fellows are assigned: And fourthly, The Ordinances and Rites which we observe.

The End of our Foundation, is the Knowledge of Causes and Secret Motions of things, and the enlarging of the Bounds of Humane Empire, to the efficacy of all things possible.

The Preparations and Instruments, are these. We have large and deep Caves of several depths; the deepest are sunk Six hundred fathom, and some of them are dug and made under great Hills and Mountains; so that if you reckon together the depth of the Hill, and the depth of the Cave, they are (some of them) above three miles deep: For we find that the depth of an Hill, and the depth of a Cave from the Flat, is the same thing; both remote alike from the Sun and Heavens Beams, and from the open Air. These Caves we call the Lower Region, and we use them for all Coagulations, Indurations, Refrigerations, and Convervations of Bodies. We use them likewise for the Imagination of Natural Mines, and the producing also of new Artificial Metals, by Compositions and Materials which we use and lay there for many years. We use them also sometimes (which may seem strange) for curing of some Diseases, and for prolongation of life in some Hermits that chuse to live there, well accommodated of all things necessary, and indeed live very long; by whom also we learn many things.

We have Burials in several Earths, where we put divers Cements as the Chinese do their Porcellane; but we have them in greater variety and some of them more fine. We also have great variety of Composts and Soils for the making of the Earth fruitful.

We have high Towers, the highest about half a mile in height, and some of them likewise set upon high Mountains, so that the vantage of the Hill with the Tower, is in the highest of them, three miles at least. And these places we call the Upper Region, accounting the Air between the high places, and the Low as a Middle Region. We use these Towers, according to their several heights and situations, for Inflation, Refrigeration, Convervation, and for the view of divers Meteors, as Winds, Rain, Snow, Hail, and some of the Fiery Meteors also. And upon them, in some places, are dwellings of Hermits, whom we visit sometimes, and instruct what to observe.

We have great Lakes, both salt and fresh, whereof we have use for the Fish and Bowl. We use them also for Burials of some Natural Bodies; for we find a difference in things buried in Earth, or in Air below the Earth, and things buried in Water. We have also Pools, of which some do drain Fresh Water out of Salt, and others by Art do turn Fresh Water into Salt. We have also some Rocks in the midst of the Sea, and some Bays upon the Shore for some Works, wherein is required the Air and Vapor of the Sea. We have likewise violent streams and cataracts, which serve us for many Motions; and likewise Engins for multiplying and enforcing of Winds, to set also ongoing divers Motions.
We have also a number of artificial Wells and Fountains, made in imitation of the Natural Sources and Baths; as tinged upon Vitriol, Sulphur, Steel, Brass, Lead, Nitre, and other Minerals. And again we have little Wells for Infusions of many things, where the Waters take the virtue quicker and better than Vessels or Basons: And amongst them we have a Water which we call Water of Paradise, being by that we do to it, made very sovereign for Health, and Prolongation of Life.

We also great and spacious Houses, where we imitate and demonstrate Meteors; as Snow, Hail, Rain, some Artificial Rains of Bodies, and not of Water, Thunders, Lightnings; also Generations of Bodies in Air, as Frogs, Flies, and divers others.

We have also certain Chambers which we call Chambers of Health, where we qualify the Air, as we think good and proper for the cure of divers Diseases, and preservation of Health.

We have also fair and large Baths of several mixtures, for the cure of Diseases, and the restoring of Men's Body from Arefation; and other, for the confirming of it in strength of Sinews, Vital Parts, and the very Juice and Substance of the Body.

We have also large and various Orchards and Gardens, wherein we do not so much respect Beauty, as variety of ground and soil, proper for divers Trees and Herbs; and some very spacious, where Trees and Herbs are set, whereof we make divers kindes of Drinks, besides the Vineyards.

In these we practice likewise all conclusions of Grafting and Inoculating, as well of Wild-trees as Fruit-trees, which produce 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 up and bear more speedily then by their natural course do. We make them also (by Art) much greater then their nature, and their Fruit greater and sweeter, and of differing taste, smell, colour and figure from their nature; and many of them we so order, that they become of Medicinal use.

We have also means to make divers Plants rise, by mixtures of Earths without Seeds, and likewise to make divers new Plants differing from the Vulgar, and to make one Tree or Plant turn into another.

We have also Parks and Enclosures of all sorts of Beasts and Birds; which we use not only for view or rareness, but likewise for Diſections and Fryals, that thereby we may take light, what may be wrought upon the Body of Man, wherein we finde many strange effects; as continuing life in them, though divers parts, which you account vital, be perished and taken forth; Reflucitating of some that seem dead in appearance, and the like. We try also all poisons and other medicines upon them, as well of Chirurgery as Physick. By Art likewise we make them greater or taller then their kind is, and contrariwise dwarf them, and stay their growth: We make them more fruitful and bearing, then their kind is, and contrariwise barren and not generative. Also we make them differ in colour, shape, activity, many ways. We finde means to make commixtures and copulations of divers kinds, which have produced many new kinds, and them not barren, as the general opinions. We make a number of kindes of Serpents, Worms, Flies, Hiftes, of Putrefaction; whereof some are advanced (in effect) to be perfect Creatures, like Beasts or Birds, and have Sexes, and do propagate. Neither do we this by chance, but we know beforehand of what matter and commixture what kind of those Creatures will arise.
"We have also particular Pools where we make trials upon Fishes, as we have said before of Beasts and Birds.

"We have also places for Breed and Generation of those Kinds of Worms and Flies which are of special use, such as are with you, your Silk-worms and Bees.

"I will not hold you long with reckoning of our Brew-houses, Bake-houses and Kitchens, where are made divers Drinks, Breads, and Meats; rare and of special effects. Wines we have of Grapes, and Drinks of other Juice, of Fruits, of Grains and of Roots; and of mixtures with Honey, Sugar, Manna, and Fruits dried and decocted; also of the Tears of Woundings of Trees, and of the Pulp of Canes; and these Drinks are of several Ages, some to the age of forty years. We have Drinks also brewed with several Herbs, and Roots, and Spices, yes, with several Fleshes, and White-meats, whereof some of the Drinks are such as they are in effect Meat and Drink both; so that divers, especially in Age, do desire to live with them with little or no Meat or Bread. And above all, we strive to have Drinks of extreme thin parts, to intimate into the Body, and yet without all biting, sharpness or fretting; insomuch, as some of them put upon the back of your hand, will, with a little stay, pass through to the palm, and yet taste mild to the mouth. We have also Waters which we ripen in that fashion as they become nourishing; so that they are indeed excellent Drink, and many will use no others. Breads we have of several Grains, Roots and Kernels, yes, and some of Flesh and Fitch dried, with divers kinds of Leavenings and Seasonings; so that some do extremely move Appetites; some do nourish so, as divers do live of them without any other Meat, who live very long. So for Meats, we have some of them so beaten, and made tender and mortified, yet without all corrupting, as a weak heat of the Stomach will turn them into good Chylos, as well as a strong heat would meat otherwise prepared. We have some Meats also, and Breads, and Drinks, which taken by men, enable them to fast long after; and some other that used, make the very Flesh of Mens Bodies sensibly more hard and tough, and their strength far greater than otherwise it would be.

"We have Dispensatories or Shops of Medicines, wherein you may safely think, if we have such variety of Plants and Living Creatures, more then you have in Europe, (for we know what you have) the Simples, Drugs, and Ingredients of Medicines, must likewise be in so much the greater variety. We have them likewise of divers Ages, and long Fermentations. And for their Preparations, we have not only all manner of exquisite Distillations and Separations, and especially by gentle Heats, and Percolations through divers Strainers, yea, and Substances; but also exact Forms of Composition, whereby they incorporate almost as they were Natural Simples.

"We have also divers Mechanical Arts, which you have nor, and Stuff, made by them; as Papers, Linnen, Silks, Tiffues, dainty works of Feathers of wonderful lustre, excellent Dies, and many others; and Shops likewise as well for such as are not brought into vulgar use amongst us, as for those that are. For you must know, that of the things before related, many are grown into use throughout the Kingdom; but yet, if they did flow from our Invention, we have of them also for Patterns and Principals.

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"We have also furnaces of great diversities, and that keep great diversity of heats, fierce and quick, strong and constant, hot and mild; blown, quiet, dry, moist, and the like. But above all we have heats, in imitation of the Suns and Heavenly Bodies heats, that pass divers Inequalities, and (as it were) Orbs. Progressest and Retumns, whereby we may produce admirable effects. Besides, we have heats of Dungs, and of Belettes and Maws of Living Creatures, and of their Bloods and Bodies; and of Hays and Herbs laid up moist; of Lime unquenched, and such like. Instruments also which generate heat only by motion; and further, places for strong Infusions; and again, places under the Earth, which by Nature or Art yield Heat. These divers heats we use, as the nature of the operation which we intend, requireth.

"We have also Perspective Houses where we make Demonstration of all Lights and Radiations, and of all Colours; and out of things uncoloured and transparent, we can represent unto you all several colours, not in Rainbows (as it is in Gems and Prisms) but of themselves single. We represent also all Multiplications of Light, which we carry to great distance, and make so sharp as to discern small Points and Lines; also all colourations of Light, all delusions and deceits of the Sight, in Figures, Magnitudes, Motions, Colours; all demonstrations of Shadows. We finde also divers means yet unknown to you of producing of Light originally from divers Bodies. We procure means of seeing objects afar off, as in the Heaven, and remote places; and represent things near as afar off, and things afar off as near, making feigned distances. We have also helps for the Sight, far above Spectacles and Glasses in use. We have also Glasses and Means to see small and minute Bodies perfectly and distinctly, as the shapes and colours of small Flies and VVorms, grains and flaws in Gems, which cannot otherwise be seen, observations in Urine and Blood, not otherwise to be seen. We make Artificial Rainbows, Halo's, and Circles about Light. We represent also all manner of Reflections, Refractions, and Multiplication of Visual Beams of Objects.

"We have also Precious Stones of all kindes, many of them of great beauty, and to you unknown; Crytals likewise, and Glasses of divers kindes, and amongst them some of Metals vitrificated, and other Materials, beside those of which you make Glasses. Also a number of Fossiles and imperfect Minerals, which you have not; likewise Loadstones of prodigious virtue, and other rare Stones, both Natural and Artificial.

"We have also Sound-houses, where we practice and demonstrate all Sounds and their Generation. We have Harmonies which you have not, of Quarter-sounds, and lesser Slides of Sounds; divers Instruments of Music like to you unknown, some sweeter than any you have, with Bells and Rings that are dainty and sweet. We represent small Sounds as great and deep, likewise great Sounds extenuate and sharp. We make divers tremblings and warblings of Sounds, which in their original are entire. We represent and imitate all articulate Sounds and Letters, and the Voices and Notes of Beasts and Birds. We have certain helps, which let to the Ear, do further the hearing greatly. We have also divers strange and artificial Echo's reflecting the voice many times, and as it were tolling it; and some that give back the voice louder then it came, some thriller, and some deeper, yea, some rendring the voice differing in the Letters or articulate Sound from that they receive. We have all means to convey Sounds in Trunks and Pipes in strange lines and distances.
We have also Perfume-houses, wherewith we joy in also, as follows of Tailte; we multiply Smells, which may seem strange, we imitate Smells, making all Smells to breathe out of other mixtures then those that give them.

We make divers imitations of Tailte likewise, so that they will deceive any Men's taste. And in this House we contain also a Confite house, where we make all Sweet-meats, dry and moist, and divers pleasant Wines, Milks, Broths, and Salts, far in greater variety than you have.

We have also Engine-houses, where are prepared Engines and Instruments for all sorts of motions. There we imitate and practice to make swifter motions than any you have, either out of your Muskets or any Engine that you have; and to make them, and multiply them more easily, and with small force, by wheels and other means: and to make them stronger and more violent than yours are, exceeding your greatest Cannons and Bafilisks. We represent also Ordnance and Instruments of War, and Engines of all kinds, and likewise new mixtures and compositions of Gunpowder, Wildfires burning in Water and unquenchable; also Fireworks of all variety, both for pleasure and use. We imitate also fliers of Birds; we have some degrees of flying in the Air; we have Ships and Boats for going under Water, and brooking of Seas; also Swimming-girdles and Supporters. We have divers curious Clocks, and other like motions of Return, and some perpetual motions. We imitate also motions of Living Creatures by Images of Men, Beasts, Birds, Fishes, and Serpents; we have also a great number of other various motions, strange for quality, fineness and subtlety.

We have also a Mathematical-house, where are represented all Instruments, as well of Geometry as Astronomy, exquisitely made.

We have also Houses of Deceits of the Senses, where we represent all manner of feasts of Jugling, false Apparitions, Impositions and Illusions, and their Fallacies. And surely, you will easily believe that we have so many things truly Natural, which induce admiration, could in a world of particulars deceive the Senses, if we would disguise those things, and labor to make them more miraculous: But we do hate all Impositions and Lies insomuch, as we have severely forbidden it to all our Fellows, under pain of Ignominy and Fines, that they do not shew any natural work or thing, adorned or swelling, but only pure as it is, and without all affectation of strangeness.

These are (my Son) the riches of Solomon's House.

For the several employments and offices of our Fellows; we have twelve that fall into Foreign Countries under the names of other Nations, (for our own we conceal) who bring us the Books, and Abstracts, and Patterns of Experiments of all other Parts. These we call Merchants of Light.

We have three that collect the Experiments, which are in all Books. These we call Depredators.

We have three that collect the Experiments of all Mechanical Arts, and also of Liberal Sciences, and also of Practices which are not brought into Arts. These we call Mystery-men.

We have three that try new Experiments, such as themselves think good. These we call Pioneers or Miners.

We have three that draw the Experiments of the former four into Titles and Tables, to give the better light for the drawing of Observations and Axioms out of them. These we call Compilers.
"We have three that bend themselves, looking into the experiments of their fellows, and call about how to draw out of them things of use and practice for Man's life and knowledge, as well for Works, as for plain demonstration of Creatures, means of Natural Divinations, and the easy and clear discovery of the Virtues and Parts of Bodies. These we call Divers men or Benefactors.

Then after divers Meetings and Councils of our whole number, to consider of the former Labors and Collections, we have three that take care out of them to direct new Experiments of a higher Light, more penetrating into Nature then the former. These we call Lamps.

We have three others that do execute the Experiment so directed, and report them. These we call Inventors.

Lastly, We have three that raise the former Discoveries by Experiments into greater Observations, Axioms, and Aphorisms. These we call Interpreters of Nature.

We have also, as you must think, Novices and Apprentices, that the succession of the former employed Men do not fail; besides a great number of Servants and Attendants, Men and Women. And this we do also; We have Consultations which of the Inventions and Experiences, which we have discovered shall be published, and which not; and take all an Oath of Secrecy for the concealing of those which we think meet to keep secret; though some of those we do reveal sometime to the State, and some not.

For our Ordinances and Rites; we have two very long and fair Galleries. In one of these we place Patterns and Samples of all manner of the more rare and excellent Inventions; in the other we place the Statutes of all principal Inventors. There we have the Statue of your Columbus, that discovered the West-Indies, also the Inventor of Ships; your Monk that was the Inventor of Ordnance, and of Gun-Powder; the Inventor of Muses; the Inventor of Letters; the Inventor of Printing; the Inventor of Observations of Astronomy; the Inventor of Works in Metal; the Inventor of Glasses; the Inventor of Silk of the Worm; the Inventor of Wines; the Inventor of Corn and Bread; the Inventor of Sugars: And all these by more certain Tradition, then you have. Then we have divers Inventors of our own of excellent Works, which since you have not seen, it were too long to make Descriptions of them; and besides, in the right understanding of those Descriptions, you might easily err. For upon every Invention of value we erect a Statue to the Inventor, and give him a liberal and honorable reward. These Statues are some of Brass, some of Marble, and Touch-stone, some of Cedar, and other special Woods gilt and adorned, some of Iron, some of Silver, some of Gold.

We have certain Hymns and Services which we say daily, of Land and Thanks to God for his marvellous Works, and Forms of Prayers, imploring his aid and blessing for the Illumination of our Labors, and the turning them into good and holy uses.

Lastly, We have Circuits or Visits of divers principal Cities of the Kingdom, where, as it cometh to pass, we do publish such new profitable Inventions, as we think good. And we do also declare Natural Divinations of Diseases, Plagues, Swarms of hurtful Creatures, Scarcity, Tempoft, Earth quakes, great inundations, Comets, Temperature of the Year, and divers other things; and we give counsel thereupon, what the People shall do for the prevention and remedy of them.

And
New Atlantis.

And when he had said this, he stood up: And I, as I had been taught, kneeled down, and he laid his right hand upon my head, and said, God bless thee, my Son, and God bless this Relation which I have made: I give thee leave to publish it for the good of other Nations, for we here are in God's Bosom, a Land unknown. And so he left me, having assigned a value of about Two thousand Ducats for a Bounty to me, and my Fellows; for they give great largesses where they come upon all occasions.

The rest was not perfected.
Magnalia Natura praecipue quoad ulus Humanos.

Prolongation of Life.
Restitution of Youth in some degree.

Retardation of Age.
Curing of Diseases, counted Incurable.
Mitigation of Pain.

More easie and less loathsome Purgings.
increasing of Strength and Activity.
increasing of Ability, to suffer Torture or Pain.
altering of Complexions, and Fatness, and Leanness.
altering of Statures.
altering of Features.
increasing and exalting of the Intellectual Parts:

Version of Bodies into other Bodies.
Making of new Species.
Transplanting of one Species into another.

Instruments of Destruction, as of War and Poison.
Exhilaration of the Spirits, and putting them in good disposition.

Force of the Imagination, either upon another Body, or upon the Body itself.

Time in Maturations.
Time in Clarifications.

Acceleration of Putrefaction.
Decoction.
Germination.

Making rich Composts for the Earth.
Impressions of the Air, and raising of Tempefts.
Great alteration, as in Induration, Emollition, &c.
Turning Crude and Watry Substances into Oily and Unctuous Substances.
Drawing of new Foods out of Substances not now in use.
Making new Threads for Apparel, and new Stuffs, such as are Paper, Glass, &c.
Natural Divinations.
Deceptions of the Senses.
Greater Pleasures of the Senses.
Artificial Minerals and Cements.

FINIS.
NATURAL HISTORY

Century I.

Dig a Pit upon the Sea-shore, somewhat above the High-water Mark, and sink it as deep as the Low-water Mark; and as the Tide cometh in, it will fill with Water, Fresh and Potable. This is commonly practised upon the Coast of Barbary, where other Fresh Water is wanting. And Cæsar knew this well, when he was besieged in Alexandria; for by diggin of Pits in the Sea-shore, he did frustrate the laborious Works of the Enemies, which had turned the Sea-water upon the Wells of Alexandria, and so saved his Army, being then in Desperation. But Cæsar miltook the cause; for he thought that all Sea-lands had Natural Springs of Fresh-water. But it is plain, that it is the Sea-water, because the Pit filleth according to the Measure of the Tide: And the Sea-water passing or straining through the Sands, leaveth the Saltness.

I remember to have read, that Tryal hath been made of Salt-water passed through Earth; through ten Vessels, one within another, and yet it hath not lost his Saltness, as to become potable: But the same Man faith, that (by the relation of another) Salt-water drained through twenty Vessels, hath become fresh. This Experiment seemeth to cross that other of Pits, made by the Sea-side: and yet but in part, if it be true, that twenty Repetitions do the effect. But it is worth the note, how poor the Imitations of Nature are, in common course of Experiments, except they be led by great Judgment, and some good Light of Axioms. For first, there is no small difference between a Passage of Water through twenty small Vessels, and through such a distance, as between the Low-water and High-water Mark. Secondly, there is a great difference between Earth and Sand; for all Earth hath in it a kinde of Nitrous Salt, from which, Sand is more free: And besides, Earth doth not strain the Water so finely as Sand doth. But there is a third point, that I suspect as much, or more than the other two; and that is, that in the Experiment of Transmission of the Sea-water into the Pits, the Water riseth; but in the Experiment of Transmission of the Water, through the Vessels, it falleth. Now certain it is, that the Salter part of Water (once salted...
Natural History;

falted throughout) goeth to the bottom. And therefore no marvel if the
drainage of Water by descent, doth make it fresh: Besides, I do some
what doubt, that the very dashing of the Water that cometh from the Sea, is
more proper to strike off the salt part, than where the Water flieth of her
own motion.

It seemeth Percolation or Transmission (which is commonly called Strain-
ing) is a good kinde of Separation, not onely of thick from thin, and gros
from fine, but of more subtile Natures; and varieth according to the Body,
through which the Transmission is made. As if through a Woollen-bag, the
liquor leaveth the fantes; if through Sand, the fantes, &c. They speak of
severing Wine from Water, pafling it through Ivy-wood, or through other
the like porous body, but Non confar.

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

Ariftole giveth the cause vainly, Why the Feathers of Birds are of more
lively colours than the Hairs of Beasts; for no Beaff hath any fine Azure, or
Carnation, or Green Hair. He faith it is, because Birds are more in the
Beams of the Sun than Beasts, but that is manifestly untrue; for Cattle
are more in the Sun than Birds, that live commonly in the Woods, or in some
Covert. The true cause is, that the excrementious moisture of living Cre-
tures, which maketh as well the Feathers in Birds as the Hair in Beasts, paf-
seth in Birds through a finer and more delicate Strainer, than it doth in Beasts:
For Feathers passthrough Quills, and Hair through Skin.

The Clarifying of Liquors by Adhesion, is an inward Percolation, and is
effected, when some clearing Body is mixed and agitated with the Liquors;
whereby the groffer part of the Liquor sticks to that clearing Body; and so
the finer parts are freed from the groffer. So the Apothecaries clarify the
Syrups by Whites of Eggs, beaten with the Juices which they would clarify;
which whites of Eggs, gather all the dregs and groffer parts of the Juice to
them; and after the Syrup being set on the fire, the whites of Eggs them-
selves harden and are taken forth. So Hippocrates is clarified by mixing with
Milk, and stirring it about, and then pafling it through a Woollen-bag,
which they call Hippocrates Sleeve; and the clearing Nature of the Milk, draw-
ceth the Powder of the Spices, and groffer parts of the Liquor to it, and in
the paflage they fliick upon the Woollen-bag.

The clarifying of Water, is an experiment tending to Health, besides
the pleasure of the Eye, when Water is Crystaline. It is effected by calls-
ing in, and placing Pebbles at the head of a Current, that the Water may strain
through them.

It may be Percolation doth not onely cause clearness and splendor, but
sweetness of flavor; for that also followeth, as well as clearness, when the
finer parts are severed from the groffer. So it is found, that the fweats of
men that have much heat, and exercize much, and have clean Bodies and
fine Skins, do smell sweet, as was said of Alexander; and we fee commonly,
that Gums have sweet odors.

Take a Glafs, and put Water into it, and wet your finger, and draw it
round about the lip of the Glafs, preffing it somewhat hard; and
after you have drawn it some few times about, it will make the Water frisk
and
Century I.

and sprinkle up in a fine Dew. This instance doth excellently demonstrate the force of Compression in a solid Body. For whenever a solid Body (as Wood, Stone, Metal, &c.) is pressed, there is an inward tumult in the parts thereof, seeking to deliver themselves from the Compression: And this is the cause of all Violent Motion. Wherein it is strange in the highest degree, that this Motion hath never been observed, nor enquired; it being of all Motions, the most common, and the chief root of all Mechanical Operations. This Motion worketh in round at first, by way of Proof and Search, which way to deliver it self: and then worketh in Progress, where it findeth the deliverance easiest. In Liquors this Motion is visible; for all Liquors strucken, make round circles, and withal daith, but in Solids (which breaknot) it is so subtle, as it is invisible; but nevertheless bewrayeth it self by many effects, as in this instance whereof we speake. For the Pressure of the Finger furthered by the wetting (because it sticketh so much the better unto the Lip of the Glass) after some continuance, putteth all the small parts of the Glasses into work, that they strike the Water sharply; from which Percussion that sprinkling cometh.

If you strike or pierce a Solid Body that is brittle, as Glass or Sugar, it breaketh not only where the immediate force is, but breaketh all about into shivers and fitters: the Motion upon the Pressure searching all ways, and breaking where it findeth the Body weakest.

The Powder in Shot being dilated into such a Flame, as endureth not Compression, moveth likewise in round (the Flame being in the nature of a Liquid Body) sometimes recoiling, sometimes breaking the Piece, but generally discharging the Bullet, because there it findeth easieft deliverance.

This Motion upon Pressure, and the Reciprocal thereof, which is Motion upon Tenure; we use to call (by one common name) Motion of Liberty; which is, when any Body being forced to a Preserved Extent or Dimension, delivereth and restoreth itself to the natural: As when a blown Bladder (pressed) riseth again; or when Leather or Glass tentured, spring back. These two Motions (of which there be infinite instances) we shall handle in due place.

This Motion upon Pressure is excellently also demonstrated in Sounds: As when one chimeth upon a Bell, it soundeth; but as soon as he layeth his hand upon it, the sound ceaseth: And so, the sound of a Virginal Strings, as soon as the Quill of the Jack falleth from it, stoppeth. For these sounds are produced by the subtile Percussion of the Minute parts of the Bell or String upon the Air; All one, as the Water is caused to leap by the subtile Percussion of the Minute parts of the Glass upon the Water, whereof we speake a little before in the Ninth Experiments. For you must not take it to be the local shaking of the Bell or String that doth it. As we shall fully declare when we come hereafter to handle Sounds.

Take a Glass with a Belly, and a long Neb, fill the Belly (in part) with Water: Take also another Glass, whereinto put Clarke Wine and Water mingled. Reverse the first Glass, with the Belly upwards, stopping the Neb with your Finger: then dip the mouth of it within the second Glass, and remove your Finger. Continue it in that posture for a time, and it will unmingle the Wine from the Water: the Wine ascending and settling in the top of the upper Glass, and the Water descending and settling in the bottom of the lower Glass. The passage is apparent to the Eye; for you
you shall see the Wine, as it were, in a small vein, rising through the Water. For handlomenes sake (because the working requireth some small time) it were good you hung the upper Glass upon a Nail. But as soon as there is gathered so much pure and unmixed Water in the bottom of the lower Glass, as that the Mouth of the upper Glass dipeth into it, the Motion cealeth.

Let the upper Glass be Wine, and the lower Water; there followeth no Motion at all. Let the upper Glass be Water, pure, the lower Water coloured, or contrariwise there followeth no Motion at all. But it hath been tried, that though the mixture of Wine and Water, in the lower Glass, be three parts Water, and but one Wine; yet it doth not dead the Motion. This separation of Water and Wine appeareth to be made by weight; for it must be of Bodies of unequal weight, or else it worketh not; and the heavier Body must ever be in the upper Glass. But then note well, that the water being made penible, and there being a great weight of Water in the Belly of the Glass, sustained by a small Pillar of Water in the neck of the Glass; it is that which letteth the Motion on work: For Water and Wine in one Glass, with long standing, will hardly fever.

This Experiment would be extended from mixtures of several Liquors to Simple Bodies, which consist of several familiar parts: Try it in Pure with Brown or Salt-water and Fresh-water, placing the Salt-water (which is the heavier) in the upper Glass, and see whether the fresh will come above. Try it also with Water thick Sugred, and pure Water; and see whether the Water which cometh above, will lose his savor: For which purpose, it were good there were a little Cock made in the Belly of the upper Glass.

In Bodies containing fine Spirits, which do casily dissipate when you make Infusions; the Rule is, A short stay of the Body in the Liquor receiveth the Spirit, and a longer stay confoundeth it; because it driveth forth the Earthy part withal, which embalseth the finer. And therefore it is an Error in Physicians, to rest simply upon the length of stay for increasing the vertue. But if you will have the Infusion strong, in those kinds of Bodies, which have fine Spirits, your way is not to give longer time, but to repeat the Infusion of the Body oftener. Take Violets, and infuse a good Pugil of them in a Quart of Vinegar, let them stay three quarters of an hour, and take them forth, and refresh the Infusion with like quantity of new Violets seven times, and it will make a Vinegar so fresh of the Flower, as if a Twelvemonth 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 Flowers a good while after, then at first.

This Rule which we have given, is of singular use for the preparations of Medicines, and other Infusions. As for example, the Leaf of Burrage hath an excellent Spirit, to repulse the fuliginous vapor of Dusky Melancholy, and so to cure Madness: But nevertheless, if the Leaf be infused long, it yieldeth forth but a raw substance of no vertue: Therefore I suppose, that if it be taken of Wine or Wort of Beer, while it worketh before it be Tunned, the Burrage stay a small time, and be often changed with fresh, it will make a sovereign Drink for Melancholy Passions. And the like I conceive of Orange Flowers.

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.
deeper; so that if you intufe Rhubarb for an hour, and crush it well, it will purge better, and binde the Body less after the purging, than if it flood Twentyour hours: This is true, but I conceive likewise, that by repeating the Infusion of Rhubarb, several times (as was said of Violets) letting each stay in but a small time, you may make it as strong a Purging Medicine, as Stearemony. And it is not a small thing won in Physick, if you can make Rhubarb, and other Medicines that are Beneficial, as strong Purgers, as those that are not without some malignity.

Purging Medicines, for the most part, have their Purging Virtue in a fine Spirit, as appeareth by that they inure not boiling, without much loss of virtue. And therefore it is of good use in Physick, if you can retain the Purging of Virtue, and take away the unpleasant taste of the Purger; which it is like you may do, by this course of infusing of with little stay. For it is probable, that the horrible and odious taste is in the greater part.

Generally, the working by Infusions is gross and blind, except you first try the infusing of the several parts of the Body, which of them incline more speedily, and which more slowly; and so by apportioning the time, can take and leave that quality which you desire. This I know, there be two ways: 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, successively, in several Liquors. As for example, Take Orange-Pils, or Peppery, or Cinnamon, or what you will; and let them infuse half an hour in Water; then take them out, and infuse them again in other Water; and so the third time; and then take and consider the first Water, the second, and the third, and you will finde them differing, not only in strength and weaknes, but or else in taste, or odor; for it may be the first Water will have more of the scent, as more fragrant; and the second more of the taste, as more bitter or biting, &c.

Infusions in Air (for so we may call Odors) have the same diversities with Infusions in Water; in that the several Odors (which are in one Flower, or other Body) incline at several times, some earlier, some later: So we finde, that Violets, Woodbines, Strawberries, yield a pleasing scent, that cometh forth first; but soon after an ill scent quite differing from the former. Which is caused not so much by mellowing, as by the late infusing of the grosser Spirit.

As we may desire to extract the finest Spirits in some cases; so we may desire also to dischage them (as hurtful) in some other. So Wine burnt, by reason of the evaporating of the finer Spirit, inflameth less, and is belt in Agues: opium leceeth some of his poivous quality, if it be vaporised out, mingled with Spirit of Wine, or the like: Sem leceth somewhat of his windines before decoccing; and (generally) subtil or windy Spirits are taken of by Incension, or Evaporation. And even in Infusions in things that are of too high a spirit, you were better pour off the first Infusion, after a small time, and use the latter.

Bubbles are in the form of an Hemisphere; Air within, and a little Skin of Water without: And it seemeth somewhat strange, that the Air should rise so swiftly, while it is in the Water; and when it cometh to the top, should be laid by to weak a cover, as that of the Bubble is. But as for the swift ascent of the Air, while it is under the Waters, that is a motion of Percussion from the Water, which it self descending, driveth up the Air; and no motion of Levity in the Air. And this Democritus called
Natural History;

called Maws Plague. In this common Experiment, the cause of the enclosure of the Bubble is for that the Appetite to refit Separation, or Discontinuance (which in solid Bodies is strong) is also in Liquors, though fainter and weaker: As we see in this of the Bubble; we see it also in little Glasses of Spittle that Children make of Rushes; and in Caftles of Bubbles, which they make by blowing into Water, having obtained a little degree of Tenacity by Mixture of Soap: We see it also in the Siliquides of Water, which, if there be Water enough to follow, will draw themselves into a small Thred, because they will discontinue; but if there be no remedy, then they caft themselves into round Drops; which is the Figure, that faveth the Body moth from Discontinuance: The fame reason is of the Roundness of the Bubble, as well for the Skin of Water, as for the Air within: For the Air likewise avoighth Discontinuance; and therefore cafteth it self into a round Figure. And for the stop and arreft of the Air a little while, it shriveth, that the Air of it fell hath little, or no Appetite of Ascending.

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

The French (which put off the name of the French Disease, unto the name of the Diseafe of Naples) doe report, That at the Siege of Naples, there were certain wicked Merchants that barrelled up Mans Flesh (of some that had been lately slain in Barbary) and fold it for Tunner; and that, upon that foul and high Nourishment, was the Original of that Diseafe. Which may well be; For that it is certain, that the Canibals, in the Veft-Indies, eat Mans Flesh; and the Veft-Indies were full of the Pox when they were first discovered: And at this day the Morals of persons, practised by the Veft-Indians, have some mixture of the Blood, or Fat, or Flesh of Man. And divers Witches, and Sorceresses, as well amongst the Heathens, as amongst the Christians, have fed upon Mans flesh, to aid (as it feemeth) their Imagination, with high and foul Vapors.

IT feemeth that there be these ways (in likelihood) of Vapors or Air, into Water and Moisture. The first is Cold, which doth manifeftly Condenfe: as we see in the contrading of the Air in the Weather-Glass; whereby it is a degree nearer to Water. We see it also in the Generation of Springs, which the Ancients thought (very probably) to be made by the Persoon of Air into Water, holpen by the Rest, which the Air hath in those parts, whereby it cannot dissipate. And by the coldness of Rocks; for there
there Springs are chiefly generated. We see it also in the Effects of the Cold of the Middle Region (as they call it) of the Air; which produceth Dew and Rains. And the Experiment of turning Water into Ice, by Snow, Nitre, and Salt (whereof we shall speak hereafter) would be transferred to the turning of Air into Water. The second way is by Compression; as in Stillatory, where the Vapor is turned back, upon it self, by the Encounter of the Sides of the Stillatory; and in the Dew upon the Covers of Boiling Pots; and in the Dew towards Rain, upon Marble, and Vainslot. But this is like to do no great effect; except it be upon Vapors, and gross Air, that are already very near in Degree to Water. The third is that, which may be searched into, but doth not yet appear; which is, by Mingling of moist Vapors with Air; and trying if they will not bring a Return of more Water, than the Water was at first: For it is, That Increase is a Version of the Air: Therefore put Water into the bottom of a Stillatory, with the Neb stopped; weigh the Water first; hang in the Middle of the Stillatory a large Spunge; and see what quantity of Water you can crush out of it; and what it is, more, or less, compared with the Water spent; for you must understand, that if any Version can be wrought, it will be easily done in small Pores: And that is the reason why we prescribe a Spunge. The fourth way is probable also, though not appearing; which is, by receiving the Air into the small Pores of Bodies: For (as hath been said) everything in small quantity is more easy for Version; and Tangible Bodies have no pleasure in the comfort of Air, but endeavor to subside into a more Dense Body: But in Entire Bodies is it checked; because, if the Air should Condense, there is nothing to succeed: Therefore it must be in Joole Bodies, as Sand, and Powder, which we see, if they lie close of themselves gather Moisture.

It is reported by some of the Ancients, That Whelps, or other Creatures, if they be put young into such a Cage, or Box, as they cannot rise to their Stature, but may increase in breadth or length, will grow accordingly, as they can get room; which, if it be true, and feasible, and that the young Creature be pressed, and heightened, doth not thereby, it is a means to produce Dwarf Creatures, and in a very strange Figure. This is certain, and noted long since, that the Prellure, 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 Macarocephali; which shape of the Head, at that time, was esteemed. And the raising gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which observation well weighed, may teach a means, to make the Persons of Men and Women, in many kindes, more comely and better featured, than other wise they would be; by the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Legs, to keep them from falling down too low; and by Stroaking up the Forehead, to keep them from being low Foreheaded. And it is a common practice to Swathe the Infants, that they may grow more straight, and better shaped; and we see young Women, by wearing straight Bodies, keep themselves from being Gross and Corpulent.

Nions, as they hang, will many of them shoot forth; and so will Pennyroyal; and so will an Herb called Orpin; with which they use, in the Country, to trim their Houses, binding it to a Lath, or Stick, and setting it against a Wall. We see it likewise, more especially, in the greater
Semper-vive, which will put out Branches, two or three years: But it is true, that commonly they wrap the Root in a cloth besmeared with Oyl; and renew it once in a half year. The like is reported by some of the Ancients of the stalks of Lilies. The cause is, for that these Plants have a strong dense, and succulent moisture, which is not apt to exhale; and so is able, from the old store, without drawing help from the Earth, to suffice the sprouting of the Plant: And this sprouting is chiefly in the late Spring, or early Summer; which are the times of putting forth. We fee also, that stumps of Trees, lying out of the Ground, will put forth Sprouts for a time. But it is a noble tryal, and of very great consequence, to try whether these things, in the sprouting, do encrease weight; which must be tried, by weighing them before they be hanged up; and afterwards again, when they are sprouted. For if they increase not in weight, then it is no more but this, That what they lend forth in the sprout, they leefe in some other part; but if they gather weight, then it is Magna!e Nature: For it sheweth, that Air may be made to be condensed, as to be converted into a dense Body; whereas the race and period of all things, here above the Earth, is to extenuate and turn things to be more pneumatical, and rare; and not to be retrograde, from pneumatical to that which is dense. It sheweth also, that Air can nourish; which is another great matter of consequence. Note, that to try this, the Experiment of the Semper-vive, must be made without oiling the cloth; for else, it may be, the Plant receiveth nourishment from the Oyl.

Flame and Air do not mingle, except it be in an instant; or in the Vital Spirits of vegetables, and living Creatures. In Gunpowder, the force of it hath been ascribed to rarefaction of the earthly substance into Flame. And thus far it is true; and then (forsooth) it is become another Element; the form whereof occupieth more place; and fo, of Necessity, followeth a Dilatation: And therefore, left two Bodies should be in one place, there must needs also follow an Expulsion of the Pellet, or blowing up of the Mine. But these are crude and ignorant speculations: For Flame, if there were nothing else, except it were in a very great quantity, will be suffocate with any hard body, such as a Pellet is, or the Barrel of a Gun; so as the flame would not expel 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 we call otherwise Saltpetre) which having in it a notable crude and windy Spirit, first by the heat of the Fire suddenly distilth it self; (and we know that simple Air, being preternaturally attenuated by heat, will make itself rare, and break, and blow up which that resifteth it;) And secondly, when the Nitre hath dilated it self, it bloweth abroad the flame as an inward Bellows. And therefore we see that Brimstone, Pitch, camphire, Hild, fire, and divers other inflammable matters; though they burn cruelly, and are hard to quench, yet they make no such fiery wind, as Gunpowder doth: And on the other side, we see that Quick-silver (which is a most crude and watry Body) heated, and pent in, hath the like force with Gunpowder. As for living Creatures, it is certain, their Vital Spirits are a substance compounded of an airy and flanny matter; and though Air and Flame, being free, will not well mingle; yet bound in by a Body that hath some fixing, they will. For that you may best see in those two Bodies (which are their Aliments) Water and Oyl; for they likewise will not well mingle of themselves, but in the Bodies of Plants, and
and Living Creatures, they will. It is no marvel therefore, that a small quantity of Spirits, in the Cells of the Brain, and Cannals of the Sinews, are able to move a whole Body (which is of so great mass) both with so great force, as in Wrestling, Leaping; and with so great swiftness, as in playing Division upon the Lute: Such is the force of these two Natures, Air and Flame when they incorporate.

Take a small Wax-Candle, and put it in a Socket of Brass or Iron, then set it upright in a Porringer full of Spirit of Wine, heated; then set both the Candle, and Spirit of Wine on fire; and you shall see the flame of the Candle open it self, and become four or five times bigger then otherwise it would have been, and appear in figure Globular, and not in Pyramis. You shall see also, that the inward flame of the Candle keepeth colour, and doth not wax any whit blew towards the colour of the outward flame of the Spirit of Wine. This is a noble instance, wherein two things are most remarkable: the one, that one flame within another quencheth not, but is a fixed Body, and continueth as Air or Water do; and therefore flame would still ascend upwards in one greatnes, if it were not quenched on the sides; and the greater the flame is at the bottom, the higher is the rise. The other, that Flame doth not mingle with Flame, as Air doth with Air, or Water with Water, but onely remaineth contiguous; as it cometh to pass, betwixt Conflicting Bodies. It appeareth also, that the form of a Pyramis in Flame, which we usually see, is meerly by accident, and that the Air about, by quenching the sides of the Flame, crusheth it, and exsxtuateth it into that form; for of it self, it would be round: And therefore Smoke is in the figure of a Pyramis revered; for the Air quencheth the Flame, and receiveth the Smoke. Note also, that the flame of the Candle, within the flame of the Spirit of Wine, is troubled, and doth not onely open and move upwards, but moveth waving, and to and fro: As if Flame of his own Nature (if it were not quenched) would roll and turn as well as move upwards. By all which it should seem, that the Celestial Bodies (most of them) are true Fires or Flames, as the Stocks hold; more fine (perhaps) and raffy, than our flame is. For they are all Globular and Determinate, they have Rotation, and they have the colour and splendor of Flame: So that Flame above, is durable and constant, and in his natural place; but with us, it is a stranger, and momentary and impure, like Vulcan that halted with his fall.

Take an Arrow, and hold it in Flame for the space of ten Pulses; and when it cometh forth, you shall finde those parts of the Arrow which were one the outsides of the Flame, more burned, blacked, and turned almost into a Coal; whereas that in the midst of the flame, will be as if the fire had scarce touched it. This is an instance of great consequence for the discovery of the nature of Flame, and sheweth manifestly, that Flame burneth more violently towards the sides, then in the midst: And, which is more, that Heat or Fire is not violent or furious, but where it is checked and pent. And therefore the Peripateticks (howsoever their opinion of an Element of Fire, above the Air, is justly exploded) in that point they acquit themselves well: For being opposed, that if there were a sphere of Fire, that incompanied the Earth to near hand, it were impossible, but all things should be burnt up; they answer, that the pure Elemental Fire, in his own place, and not irritate, is but of a moderate heat.
It is affirmed constantly by many, as an usual Experiment, That a lump of Fire, in the bottom of a Mine, will be tumbling and stirred by two Mens strength; which if you bring it to the top of the Earth, will ask six Mens strength at the least to stir it. It is a noble instance, and is fit to be tried to the full: For it is very probable, that the Motion of Gravity worketh weakly, both far from the Earth, and also within the Earth: The former, because the appetite of Union of Denfe Bodies with the Earth, in respect of the distance is more dull. The latter, because the Body hath in part attained his nature, when it is some depth in the Earth. For as for the moving to a point or place (which was the opinion of the Ancients) it is a mere vanity.

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

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

The operation of Purging Medicines, and the causes thereof, have been thought to be a great Secret; and so according to the slothful manner of Men, it is referred to a Hidden Propriety, a Specific Virtue, and a Fourth Quality, and the like shifts of Ignorance. The Causes of Purging, are divers, Allplain and perspicuous, and thereby maintained by experience. The first is, That whatsoever cannot be overcome and digested by the Stomack, is by the Stomack, either put up by Tumis, or put down to the Guts; and by that Motion of Expulsion in the Stomack and Guts, other Parts of the Body (as the Orites of the Veins, and the like) are moved to expel by Confect: For nothing is more frequent than Motion of Confect in the Body of Man. This Surcharge of the Stomack, is caused either by the Quality of the Medicine, or by the Quantity. The Qualities are three, Extream Bitter, as in Aloes, Colognimtida, &c. Loathsome, and of horrible taste, as in Agarik, Black Helleboore, &c. And of secret Malignity, and disagreement towards Mans Body, many times not appearing much in the taste, as in Scanmony, Machaonixam, Animony, &c. And note well, that if there be any Medicine that purgeeth, and hath neither of the first two Manifest Qualities, is to be held suspected as kindes of Poyson; Forthat it worketh either by Corrosion, or by a secret Malignity, and Eunony to Nature; and therefore such Medicines are warily to be prepared and used. The quantity of that which is taken, doth also cause Purging, as we see in a great quantity of new Milk from the Cow, yea, and a great quantity of Meat:
Surfeits many times turn to Purges, both upwards and downwards. Therefore we see generally, that the working of Purging Medicines cometh two or three hours after the Medicines taken: For that the Stomack first maketh a proof, whether it can concoct them. And the like happeneth after Surfeits, or Milk in too great quantity.

A second cause is Mordication of the Orifices of the Parts, especially of the Medencyte; as it is seen, that salt, or any such thing that is sharp and biting, put into the Fundament, doth provoke the part to expel, and Mustard provoketh sneezing; and any sharp thing to the eyes provoketh tears. And therefore we see, that almost all Purges have a kind of twitching and vellication, besides the griping which cometh of wind. And if this Mordication be in an over-high degree, it is little better than the Caroson of Toxons, and it cometh to pass sometimes in Answamy, especially if it be given to Bodies not repose with humors; for where humors abound, the humors have the parts.

The third cause is Attracution: For I do not deny, but that Purging Medicines have in them a direct force of Attracution; as Drawing-Plasters have in Surgery: And we see Suce, or Bittony bruised, sneezing-powder, and other Powders or Liquors (which the Physicians call Erthines) put into the Nose, draw Flegm and Water from the Head; and so it is in Aphabetmatisnun and Gargarism that draw the Rheume down by the Path. And by this virtue, no doubt, some Purgers draw more one humor, and some another, according to the opinion received: As Rubarb draweth Choler, Soan Melancholy, Agarack, Flegm, &c. but yet (more or less) they draw promiscuously. And note also, that besides Sympathy between the Purger and the Humor, there is also another cause, why some Medicines draw some humor more than another; and it is, for that some Medicines work quicker than others; and they that draw quick, draw onely the lighter, and more fluid humors; they that draw slow, work upon the more tough, and vicious humors. And therefore, men must beware how they take Rubarb, and the like, alone, familiarly; for it taketh onely the lightest part of the humor away, and leaveth the Mass of Humors more oblitinate. And the like may be said of Wormwood, which is so much magnified.

The fourth cause is Flatusity: For wind stirred, moveth to expel; and we finde that (in effect) all Purgers have in them a raw Spirit of Wind, which is the principal cause of Torison in the Stomack and Belly. And therefore Purgers leese (most of them) the virtue, by decoction upon the fire; and for that cause are chiefly given in Infusion, Juyce, or Powder.

The fifth cause is Compression or Crusting: As when Water is crueth out of a Spunge: So we see that taking cold moveth loosness by contration of the Skin, and outward parts; and to doth Cold likewise cause Rheums and Definition from the Head, and some Astringent Plasters crueth outpurrent Matter. This kind of operation is not found in many Medicines: Mirabalanse have it, and it may be the Banks of Rivers; for this virtue requireth an Attrition, but such an Attrition, as is not grateful to the Body (for a pleasing Attrition doth rather binde in the humors, than expel them.) And therefore such Attrition is found in things of an harthful taste.

The sixth cause is Lubrefaction and Relaxation: As we see in Medicines Emollient, as are Milk, Honey, Mallowe, Leesure, Mercurial, Pellitory of the Wall, and others. There is also a secret virtue of Relaxation of Cold; for the heat of the Body bindeth the Parts and Humors together, which
The seventh cause is Abstention, which is plainly a scouring off, or infusion of the more vicious humors, and making the humors more fluid, and cutting between them, and the part; as is found in Nitrous Water, which ifoureth Linnen-Cloth (speedily) from the foulnes. But this Infusion must be by a Sharpneß, without Abstention; which we finde in Salt, Wormwood, Oxymel, and the like.

There be Medicines that move Stools, and not Urine; some other Urine, and not Stools. Tho' that Purge by Stool, are such as enter not at all, or little into the Mesentery Veins; but either at the first, are not digestible by the Stomack; and therefore move immediately downwards to the Guts: or else are afterwards rejected by the Mesentery Veins, and so turn likewife downwards to the Guts: and of these two kinds, are most Purgers. But those that move Urine, are such as are well digested of the Stomack, and well received also of the Mesentery Veins: so they come as faras the Liver, which sendeth Urine to the Bladder, as the Whey of Blood: And those Medicines, being opening and piercing, do fortifie the operation of the Liver, in sending down the Wheyey part of the Blood to the Reins. For Medicines Primitive do not work by rejection and indigestion, as Solvitive do.

There be divers Medicines, which in greater quantity move Stool, and in smaller, Urine; and so contrariwise, some that in greater quantity move Urine, and in smaller Stool. Of the former sort is Rubarb, and some others. The cause is, forthat Rubarb is a Medicine, which the Stomack in a small quantity doth digest, and overcome (being not Flatuous nor Loathsome,) and so fetheth it to the Mesentery Veins; and so being opened, it helpeth down Urine: But in a greater quantity, the Stomack cannot overcome it, and so it goeth to the Guts. Pepper, by some of the Ancients, is noted too be of the second sort; which being in small quantity, moveth wind in the Stomack or Guts, and so expelled by Stool; but being in greater quantity, dissipateth the wind, and it self getteth to the Mesentery Veins, and so to the Liver and Reins; where, by Heating and Opening, it tendeth down Urine more plentifully.

Experiments in Confort, touching Meats and Drinks that are most nourishing.

We have spoken of Evacuating of the Body, we will now speak something of the filling of it by Restoratives in Consumptions and Emaciating Differences. In Vetebables, there is one part that is more nourishing than another; as Grains and Roots nourish more than the Leaves, insomuch as the Order of the Folkists was put down by the Pope, as finding Leaves unable to nourish Mans Body. Whether there be that difference in the Flesh of Living Creatures, is not well enquired; as whether Livets, and other Embrutes, be not more nourishing than the outward Flesh. We finde that amongst the Romans, a Goose's Liver was a great delicacy; insomuch, as they had artificial means to make it fair, and great; but whether it were more nourishing, appeareth not. It is certain, that Barrow is more nourishing than Fat. And I conceive, that some decoction of Bones and Wine, stamped and well strained, would be a very nourishing Broth: We finde also, that Scotch Skinck (which is a Pottage of strong nourishment) is made.
made with the Knees and Sinews of Beef, but long boiled: *Jelly also, which they use for a Keltorative, is chiefly made of Knuckles of Veal. The Pulp, that is within the Cranieth or Crab, which they spice and butter, is more nourishing then the flesh of the Crab, or Cranieth. The Yolks of Eggs are clearly more nourishing than the Whites. So that it should seem, that the parts of *Living Creatures* that lie more inwards, nourish more than the outward flesh: except it be the Brain, which the Spirits prey too much upon, to leave it any great virtue of nourishing. It seemeth for the nourishing of aged Men, or Men in Consumptions, some such thing should be devised, as should be half Chybus, before it be put into the stomach.

Take two large Capons, perboil them upon a soft fire, by the space of an hour or more, till in effect all the Blood be gone. Add in the decoction the Pill of a Sweet-Lemmon, or a good part of the Pill of a Citron, and a little Mace. Cut off the Shanks, and throw them away; then with a good strong Chopping-knife, mince the two Capons, Bones and all, as small as ordinary minced Meat; put them into a large neat Boulter, then take a Kilderkin, sweet, and well seasoned, of four Gallons of Beer of Eight shillings strength, new as it cometh from the Tunning; make in the Kilderkin a great Bung-hole of purpose, then thrust it in, the Boulter (in which the Capons are) drawn out in length: let it steep in it three days and three nights, the Bung-hole open to work, then close the Bung hole, and so let it continue a day and a half, then draw it into Bottles, and you may drink it well after three days Bottling, and it will last six weeks (approved). It drinketh fresh, floweth, and mantleth exceedingly, it drinketh not newish at all, it is an excellent drink for a Consumption to be drunk either alone, or carred with some other Beer. It quencheth thirst, and hath no whit of windines. Note, that it is not possible, that Meat and Bread, either in Broths, or taken with Drink, as is used, should get forth into the Veins, and outward Parts, so finely, and easily, as when it is thus incorporate, and made almost a Chybus aforesaid.

Ttryal would be made of the like Brew with Pottato-Roots, or Bar-Roots, or the Pith of *Artichokes*, which are nourishing Meats: It may be tried also, with other flesh; as Pheasants, Partridges, Young Pork, Pig, Venison, especially of Young Deer, &c.

A Mortreffe made with the Brown of Capons, stamped, and drained, and mingled (after it is made) with like quantity, at the leaff, of Almond Butter, is an excellent Meat to nourish those that are weak, better than Black-Manger or Jelly: And so is the Cullice of Coeks, boiled thick with the like mixture of Almond Butter: For the Mortreffes or Cullice of itself, is more savoury and strong, and not so fit for nourishing of weak Bodies, but the Almonds that are not of so high a taste as flesh, do excellently qualify it.

*Indian Maiz* hath (of certain) an excellent Spirit of Nourishment, but it must be thoroughly boiled, and made into a Maiz-Cream like a Bury-Cream. I judge the same of Rice, made into a Cream; for Rice is in Turkey, and other Countreys of the East, most fed upon, but it must be thoroughly boiled in respect of the hardnes of it; and also, because otherwise it bindeth the Body too much.

Pistachoes, so they be good and not mushy, joyned with Almonds in Almond Milk, or made into a Milk of themselves, like unto Almond Milk, but more green, are an excellent nourisher. But you shall do well, to add a little Ginger scraped, because they are not without some subtil windines.
Milk warm from the Cow, is found to be a great nourisher, and a good remedy in Consumptions: But then you must purify it, when you Milk the Cow, two little Bags; the one of Powder of Mist, the other of Powder of Red Roses; for they keep the Milk somewhat from turning, or coagulating in the Stomach; and put in Sugar also for the same cause, and partly for the tastes fake: But you must drink a good draught, that it may stay a little time in the Stomach, lest it coagulate: And let the Cup, into which you milk the Cow, be set in a greater Cup of hot Water, that you may take it warm. And Cow-milk thus prepared, I judge to be better for a Consumption, than Aft-milk, which (it is true) turns not so easily, but it is a little harsh. Marry it is more proper for sharpness of Urine, and Exulceration of the Bladder, and all manner of Lenifyings. Women's milk likewise is prescribed, when all fails; but I commend it not, as being a little too near the Jucye of Mans Body, to be a good nourisher; except it be in Infants, to whom it is natural.

Oil of sweet Almonds newly drawn, with Sugar and a little Spice, spread upon Bredt toasted, is an excellent nourisher; but then to keep the Oil from frying in the Stomach, you must drink a good draught of Milde-Beer after it; and to keep it from relaxing the Stomach too much, you must put in a little Powder of Cinnamon.

The Tallow of Eggs are of themselves so well prepared by Nature for nourishment, as (to be Poached, or Rear boiled) they need no other preparation or mixture; yet they may be taken also raw, when they are new laid, with Maltswine or Sweet Wine. You shall do well to put in some few slices of Eringium Root, and a little Amber-grace: For by this means, besides the immediate faculty of nourishment, such drink will strengthen the Back, so that it will not draw down the Urine too fast. For too much Urine doth always hinder nourishment.

Mincing of Meats, as in Pies, and Buttered minced Meat, saveth the grinding of the Teeth; and therefore (no doubt) it is more nourishing, especially in Age, or to them that have weak Teeth; but the Butter is not so proper for weak Bodies, and therefore it was good to moisten it with a little Claret Wine. Pill of Lemon or Orange cut small, Sugar, and a very little Cinnamon, or Nutmeg. As for Cheese, which are likewise Minced-meat; instead of Butter, and Fat, it were good to moisten them, partly with Cream, or Almond, or Piftachomilk, or Barley, or Maiz Cream; adding a little Coriander-feed, and Carraway-feed, and a very little Saffron. The more full handling of Alimentation, we refer to the due place.

We have hitherto handled the Particulars, which yield best, and easiest, and plentifulest, Nourishment; and now we will speak of the best Means of conveying, and converting the Nourishments.

The first Means is to procure, that the Nourishment may not be robbed and drawn away; wherein that which we have already laid, is very material, to provide, that the Reins draw not too strongly an over-great part of the Blood into Urine. To this add that Precept of Aristotle, That Wine be forborn in all Consumptions; for that the Spirits of the Wine do prey upon the Rofside Jucye of the Body, and inter-common with the Spirits of the Body, and do deceive and rob them of their Nourishment. And therefore if the Consumption, growing from the weaknels of the Stomach, do force you to use Wine, let it always be burnt, that the quicker Spirits may evaporate, or (at the least) quenched with two little Wedges of Gold, six or seven times repeated. Add also this Provision, that there be not too much expence of
of the nourishment, by Exhaling and Sweating: And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly Hipocrates Rule is to be followed, who adviseth quite contrary to that which is in use: Namely, That the Linnen or Garment next the Flesh, be in Winter dry and oft changed; and in Summer seldom changed, and smeared over with Oyl: For certain it is, that any Substance that is fat, doth a little fill the Pores of the Body and stay Sweat in some degree. But the more cleanly way is to have the Linnen smeared lightly over with Oyl of sweet Almonds, and not to forbear shifting as oft as is fit.

The second Means is to send forth the nourishment into the parts more strongly, for which, the working must be by strengthening of the Stomack; and in this, because the Stomack is chiefly comforted by Wine and hot things, which otherwise hurt, it is good to refer to outward applications to the Stomack: Wherein it hath been tried, that the Quilts of Roses, Spices, Mallick, Wormwood, Mint, &c. are not so helpful, as to take a Cake of New Bread, and to bedew it with a little Sack or Mead, and to dry it, and after it be dryed alittle before the Fire, to put it within a clean Napkin, and to lay it to the Stomack: For it is certain, that all Flower hath a potent Virtue of Aversion, insomuch, as it hardeneth a piece of Flesh, or a Flower thus laid in it. And therefore a Bag quilited with Bran, is like wife very good, but it dryeth somewhat too much, and therefore it must not lie long.

The third Means (which may be a branch of the former) is to send forth the nourishment the better by sleep. For wee see, that Bears and other Creatures that sleep in the Winter, was exceeding fat: And certain it is, (as it is commonly believed) that Sleep doth nourish much, both for that the Spirits do less spend the nourishment in Sleep, than when living Creatures are awake: And because (that which is to the present purpose) it helpeth to thruff out the nourishment into the parts. Therefore in aged-men, and weak Bodies, and such as abound not with Choler, a short sleep after dinner doth help to nourish; for in such Bodies there is no fear of an over-hafty digestion, which is the inconvenience of Post-meridiunn Sleeps. Sleep also in the morning, after the taking of somewhat of ease digestion; as Milk from the Cow, nourishing Broth, or the like, doth further nourishment: But this would be done sitting upright, that the Milk or Broth may pass the more speedily to the bottom of the Stomack.

The fourth Means is to provide, that the parts themselves may draw to them the nourishment strongly. There is an excellent observation of Aristotle, that a great reason why Plants (some of them) are of greater age than Living Creatures is, for that they yearly put forth new Leaves and Boughs; whereas Living Creatures put forth (after their period of growth) nothing that is young, but Hair and Nails, which are Excrements, and no Parts. And it is most certain, that whatsoever is young, doth draw nourishment better, than that which is old; and then (that which is the mystery of that observation) young Boughs and Leaves, calling the Sap up to them, the same nourisheth the Body in the passage. And this we see notably proved also, in that the oft cutting or pollin of Hedges, Trees, and Herbs, doth conduce much to their lafting. Transfer therefore this observation to the helping of nourishment in Living Creatures: The Noblest and Principal Use whereof is, for the Prolongation of Life; Restauration of some degree of Youth, and Interneration of the Parts: For certain it is, that there are in Living Creatures Parts that nourish and repair easily, and parts that nourish
nourish and repair hardly; and you must refresh, and renew those that are
case to nourish, that the other may be restored, and (as it were) drink in
nourishment in the passage. Now we see that Draughts, Ovem put into good
Pallure, recover the flesh of young Beef; and Men after long emaciating
Diets, wax plump and fat, and almost new. So that you may, surely conclude,
that the frequent and wise use of those emaciating Diets, and of Purgings;
and perhaps of some kind of Bleeding, is a principal means of prolonga-
tion of life, and restoring some degree of Youth: For as we have often said,
Death cometh with Living Creatures like the Torment of Mezenium,

Component Membranous Mucous, acque et humors.

For the parts in Mans body easily repairable (as Spirits, Blood, and Fleth)
die in the embrace of the parts hardly repairable (as Bones, Nerves,
and Membranes) and likewise some Entrails (which they reckon amongst
the Spermathical Parts) are hard to repair: Though that division of Sper-
mathical and Membranous Parts, be but a conceit. And this same observation
also may be drawn to the present purpose of nourishing emaciated Bodies;
And therefore Gentle Emaciation draweth forth the nourishment, by making
the parts a little hungry and heating them, whereby they call forth nourish-
ment the better. This Emaciation I wish to be done in the morning. It is
also best done by the Hand, or a piece of Scarlet-Wool, wet a little with
Oyl of Almonds, mingled with a small quantity of Bay-Salt, or Saffron: We
see that the very Currying of Horses doth make them fat, and in good
liking.

The fifth means is, to further the very act of Assimilation of Nourish-
ment; which is done by some outward emollients, that make the parts more
apt to Assimilate. For which I have compounded an ointment of excellent
odor, which I call Roman ointment, vide the Receipt. The use of it would be
between three; for in the latter sleep, the parts assimilate chiefly.

There be many Medicines, which by themselves would do no cure, but
perhaps hurt, but being applied in a certain order, one after another,
do great cures. I have tried (myself) a Remedy for the Gout, which hath
often failed, but driven it away in Twenty four hours space: It is first to
apply a Pulsatif, of which, vide the Receipt, and then a Bath or Fomentation,
of which, vide the Receipt, and then a Plaister, vide the Receipt. The Pulsatif
relaxed the Pores, and maketh the humor apt to exhale. The Fomentation
calleth forth the Humor by Vapors, but yet in regard of the way made by
the Pulsatif, draweth gently; and therefore draweth the Humors out, and
doth not draw more to it: For it is a Gentle Fomentation, and hath withal
a mixture (though very little) of some stupefactive. The Plaister is a
moderate Astringent Plaister, which repelleth new humor from falling.
The Pulsatif alone would make the part more soft and weak, and apter to take
the delusion and impression of the Humor. The Fomentation alone, if it
were too weak, without way made by the Pulsatif, 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 Humor already contained in the part, and to exalpe-
rate it, as well as forbid new Humor; therefore they must be all taken in
order, as is said: The Pulsatif is to be laid to for two or three hours; the
Fomentation for a quarter of an hour, or somewhat better, being used hot,
and seven or eight times repeated; the Plaister to continue on still, till the
part be well confirmed.
Here is a secret way of Cure, unpractised by. Affection of that which in itself hurteth. Poisons have been made by some Familiar, as hath been said. Ordinary Keepers of the sick of the Plague, are seldom infected. Enduring of Tortures, by custom hath been made more easie: The brooking of enormous quantity of Meats, and fo of Wine, or strong drink, hath been by custom made to be without Surfeit or Drunkenness. And generally Diseales that are Chronicall, as Coughs, Phisicks, some kinde of Pallies, Lunesies, &c. are most dangerous at the first: Therefore a wise Physician will consider, whether a Diseale be incurable, or whether the just cure of it be not full of peril; and if he finde it to be such, let him retort to Palliation, and alleviate the Symptom without buffering himself too much with the perfect cure: And many times (if the Patient be indeed patient) that course will exceed all expectation. Likewise the Patient himself may thrive, by little and little to overcome the Symptom in the Exacerbation, and so by timetum suffering into Nature.

Divers Diseales, especially Chronicall, (such as quartan Agues) are sometimes cured by Surfeit and Excess; as excess of Meat, excess of Drink, extraordinary Paling, extraordinary toasting, or Latitudine, and the like. The cause is, for that Diseales of continuance, get an adventitious strength from Custom, besides their material cause from the Humors: So that the breaking of the Custom doth leave them onely to their first cause; which, if it be anything weak, will fall off. Besides, such Excelses do excite and spur Nature, which thereupon riseth more forcibly against the Diseale.

Here is in the Body of Man, a great content in the Motion of the several parts: We see it is Childrens sport, to prove whether they can rub up on their Breast with one hand, and patupon their Forehead with another; and straight ways they shall sometimes rub with both hands, or pat with both hands. We see, that when the Spirits that come to the Noffrils, expel a bad sent, the Stomack is ready to expel by vomit. We finde that in Confumptions of the Lungs, when Nature cannot expel by Cough, Men fall into Fluxes of the Belly, and then they die. So in Pestilential Diseales, if they cannot be expelled by Sweat, they fall likewise into Loosnes; and that is commonly Mortal. Therefore Physicians should ingeniously contrive, how by Motions that are in their power, they may excite inward Motions that are not in their power, by content; as by the Stench of Feathers, or the like, they cure the rising of the Mother.

Hippocrates Aphorism, in Morbus Minus, is a good profound Aphorism. It importeth, that Diseales contrary to the Complexion, Age, Sex, season of the year, Diet, &c. are more dangerous than those that are concurrent. A Man would think it should be otherwise; For that when the Accident of Sickness, and the Natural disposition, do second the one the other; the Diseale should be more forcible. And (to no doubt) it is, if you suppose like quantity of Matter. But that which maketh good the Aphorism, is, because such Diseales do shew a greater collection of Matter, by that they are able to overcome those Natural inclinations to the contrary. And therefore in Diseales of that kinde, let the Physician apply himself more to Purgation, than to Alteration; because the offence is in the quantity, and the qualities are rectified of themselves.
Physicians do wisely prescribe, that there be Preparatives used before Purgations; for certain it is, that Purgers do many times great hurt, if the Body be not accommodated, both before and after the Purgings. The hurt that they do, for want of Preparation before Purgings, is by the thickening of the Humors, and their not coming fair away; which cauleth in the Body great perturbations, and ill accidents, during the Purgings; and also the diminishing and dulling of the working of the Medicine itself, that it purgeth not sufficiently: Therefore the work of Preparation is double, to make the Humors fluid and mature, and to make the passages more open; For those both help to make the Humors pass readily: And for the former of these, Syrups are most profitable; and for the latter, Aposums or Preparing Broths; Clysters also help left the Medicine stop in the Guts, and work griping-ly. But it is true, that Bodies abounding with Humors, and fat Bodies, and open Weather, are Preparatives in themselves; because they make the Humors more fluid: But let a Physician beware how he purge after hard Frosty Weather, and in a lean Body, without Preparation. For the hurt that they may do after Purgings, it is caused by the lodging of some Humors in ill places; for it is certain, that there be Humors which somewhere placed in the Body, are quiet, and do little hurt; in other places (especially Passages) do much mischief. Therefore it is good after Purgings, to use Aposums and Broths, not so much opening as those used before Purgings, but Abstiruvive and Mundifying Clysters also are good to conclude with, to draw away the relics of the Humors that may have descended to the lower region of the Body.

Blood is stanched divers ways: First, by Astringents and Repercussive Medicines. Secondly, by drawing of the Spirits and Blood inwards, which is done by cold; as Iron or a Stone laid to the Neck doth stanch the Bleeding of the Nose; also it hath been tried, that the Teistiels being put into sharp Vinegar, hath made a sudden reces of the Spirits, and stanched Blood. Thirdly, by the Reces of the Blood by Sympathy; for it hath been tried, that the part that bleedeth, being thrulb into the body of a Capon, Sheep, new ript and bleeding, hath stanchd Blood; the Blood, as it leemeth, fucking and drawing up, by fimilitude of substance, the Blood it meets with, and lo it self going back. Fourthly, by Custom and Times: for the Prince of Arrange, in his first hurt by the Spanish Boy, could have no means to stanch the Blood, either by Medicine or Ligaments, but was fain to have the Orifice of the Wound stoped by Mens Thumbs, succeeding one another for the space at the leaf of two days; and at the left the Blood by custom onely retired. There is a fifth way also in use, to let Blood in an adverser part for a Revulsion.

It helpeth, both in Medicine and Aliments, to change and not to continue the same Medicine and Aliments still. The cause is, for that Nature by continual use of any thing, groweth to a satiety and dulness, either of Appetite or Working. And we see that Afluence of things hurtful, doth make them leesentheir force to hurt; As Poison, which with us some have brought themselves to brook. And therefore it is no marvel, though things helpfull by custome, leese their force to help, I count intermission almost the same thing with change; for that, that hath been intermitted, is after a fort new.
It is found by Experience, that in Diets of Guinea, Sarza, and the like, (especially, if they be strict) the Patients is more troubled in the beginning than a ter continuance; which hath made some of the more deliberate fort of Patients, give them over in the midst; 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, to dry up Humors, Rheums, and the like; and they cannot dry up until they have first attenuated: And while the Humor is attenuated, it is more fluid, than it was before, and troubleth the Body a great deal more, until it be dried up, and consumed. And therefore Patients must expect a due time, and not check at them at the first.

The producing of Cold is a thing very worthy the Inquisition, both for use and dilecule of caules. For these and Cold are Nature's two hands, whereby the chiefl worketh; and Heat we have in readiness, in respect of the Fire: But for Cold, we must stay till it cometh, or seek it in deep Caves, or high Mountains; and when all is done, we cannot obtain it in any great degree: For Furnaces of Fire are far hotter than a Summers Sun, but Vaults or Hills are not much colder than a Winters Frost.

The first means of producing Cold, is that which Nature presenteth us withal; namely, the expiring of Cold out of the inward parts of the Earth in Winter, when the Sun hath no power to overcome it; the Earth being (as hath been noted by some (Primum Frigida)) This hath been averted, as well by Ancient, as by Modern Philosophers. It was the tenet of Parthenides, it was the opinion of the Author of the Discourse in Plutarch, for I take it, that Book was not Plutarch's own) De primo Frigida. It was the opinion of Teleius, who hath renewed the Philosophy of Parthenides, and is the belt of the Novelties.

The second cause of Cold is, the contact of cold Bodies; for Cold is Active and Transitive into Bodies adjacent, as well as Heat; which is seen in those things that are touched with Snow or cold Water. And therefore, whosoever will be an Enquirer into Nature, let him resort to a Conserver of Snow and Ice; such as they use of delicacy, to cool Wine in Summer: Which is a poor and contemptible use, in respect of other uses that may be made of such Conserveries.

The third cause is the Primary Nature of all Tangible Bodies; for it is well to be noted, That all things whatsoever (Tangible are of themselves) Cold; except they have an accessary heat by Fire, Life, or Motion: For even the Spirit of Wine, or Chymical Oyls, which are so hot in operation, are to the first touch, Cold; and Air it felt compressed, and condensed a little by blowing, is Cold.

The fourth cause is, the Density of the Body; for all dense Bodies are colder than most other Bodies, as Metals, Stone, Glass, and they are longer in heating than lighter Bodies. And it is certain, that Earth, Dense, Tangible, hold all of the Nature of Cold: The cause is, for that all Matter Tangible being Cold, it must needs follow, that where the Matter is most congregated the Cold is the greater.

The fifth cause of Cold, or rather of increase and vehemency of Cold, is A quick Spirit inclosed in a cold Body; as will appear to any that shall attentively consider of Nature in many instances. We see Fire (which hath a quick Spirit) is Cold, more cold to the Tongue than a Stone; so Water
natural History;

is colder than Oyl, because it hath a quicker Spirit; for all Oyl, though it hath the tangible parts better digested than Water, yet hath it a duller Spirit: So Snow is colder than Water, because it hath more Spirit within it: So we see that Salt put to see (as in the producing of the Artificial ice) encreaseth the activity of cold: So some Insects which have Spirit of Life, as Snakes and Silkworms, are to the touch, Cold. So Quick-silver is the coldest of Metals, because it is fullest of Spirit.

The sixth cause of Cold is, the chaffing and driving away of Spirits, such as have some degree of Heat; for the banishing of the Heat must leave any Body cold. This was seen in the operation of Opium, and Simpaticines upon the Spirits of Living Creatures; and it were not amiss to try Opium by laying it upon the top of a Weather-Glass, to see whether it will contract the Air; but I doubt it will not succeed: For besides that, the virtue of Opium will hardly penetrate throught such a body as Glass. I conceive that Opium, and the like, make the Spirits die rather by Malignity, than by Cold.

Seventhly, the same effect must follow upon the exhaling or drawing out of the warm Spirits, that doth upon the flight of the Spirits. There is an opinion, that the Moon is Magneticall of Heat, as the Sun is of Cold and Moiture: It were not amiss therefore to try it with warm waters; the one exposed to the Beams of the Moon, the other with some skreen betwixt the Beams of the Moon and the Water: As we use to the Sun for shade, and to see whether the former will cool sooner. And it were also good to enquire, what other means there may be, to draw forth the Exile heat which is in the Air; for that may be a secret of great power to produce cold Weather.

We have formerly set down the Means of turning Air into Water, in the Experiments 27. But because it is Exaltate Nature, and tendeth to the subduing of a very great effect, and is also of manifold use: We will add some instances in Confort that give light thereunto.

It is reported by some of the Ancients, that Sailors have used every night, to hang Fleeces of Wool on the sides of their Ships, the Wool towards the Water; and that they have crufted fresh water out of them, in the Morning, for their use. And thus much we have tried, that a quantity of Wool tied loofe together, being let down into a deep Well; and hanging in the middle, some three Fathom from the Water for a night, in the Winter time, increased in weight, (as I now remember) to a fifth Part.

It is reported by one of the Ancients, that in Lydia, near Pergamus, there were certain Workmen in time of Wars, fled into Caves; and the Mouth of the Caves being stopped by the Enemies, they were famished. But long time after, the dead Bodies were found, and some Vessels which they had carried with them, and the Vessels full of Waters and that Water thicker, and more towards ice, than common Water; which is a notable instance of Condensation and Induration by Burial under Earth (in Caves) for long time; and of Verion also (as it should seem) of the Air into Water; if any of those Vessels were emptie. Try therefore a small Bladder hung in Snow, and the like in Nitre, and the like in Quick-silver: And if you finde the Bladders fall or shrunk, you may be sure the Air is condensed by the Cold of those Bodies, as it would be in a Cave under Earth.
It is reported of very good credit, that in the East-India if you see a Tub of Water open in a Room where Cloves are kept, it will be drawn dry in Twenty four hours, though it stand at some distance from the Cloves. In the Country, they use many times in deceit, when their Wool is new shorn, to set some Pails of Water by in the same Room, to encrease the weight of the Wool: But it may be, that the Heat of the Wool remaining from the Body of the Sheep, or the heat gathered by the lying clofe of the Wool, helpeth to draw the watery vapors; but that is nothing to the Verfion.

It is reported also credibly, that Wool new shorn, being laid causally upon a Vessel of Veftrice, after some time hath drunk up a great part of the Veftrice, though the Vefsel were whole without any flaw, and had not the Bung-hole open. In this instance there is (upon the by) to be noted, the Percolation or Suing of the Veftrice throw the Wool; for Veftrice of it self would never have passed through the Wool: So, as it seemeth, it must be first in a kind of vapor before it pass.

It is especially to be noted, that the cause that doth facilitate the Version of Air into Water, when the Air is not in grosr, but subtilely mingles with tangible Bodies, is, (as hath been partly touched before) for that tangible Bodies have an antipathy with Air; and if they finde any Liquid Body that is more dense near them, they will draw it; and after they have drawn it, they will condense it more, and in effect incorporate it: For we fee that a Spunge, or Wool, or Sugar, or a Woollen-cloth, being put but in part, in Water or Wine, will draw the Liquor higher, and beyond the place, where the Water or Wine cometh. We fee also, that Wood, Lute-strings, and the like, do swell in moist leasons; as appeareth by the breaking of the strings, the hard turning of the Pegs, and the hard drawing forth of Boxes, and opening of Waincoat doors, which is a kind of infusion; and is much like to an infusion in Water, which will make Wood to swell; as we see in the setting of the Chops of Bowls by laying them in Water. But for that part of these Experimentes, which concerneth Attraction, we will reserve into the proper Title of Attraction.

There is also a Version of Air into Water, seeing in the sweating of Marbles, an other Stones; and of Vaincoat before, and in moist weather. This must be, either by some moisture the Body yieldeth, or else by the moist Air thickened against the hard Body. But it is plain, that it is the latter: for that we see Wood painted with Oyl-colour, will sooner gather drops in a moist night, than Wood alone; which is caufed by the moisture and clofenes, which latteth in no part of the vapor, and so turneth it back and thicketh it into Dew. We see also, that breathing upon a Glafs, or smooth Body, giveth a Dew; and in Frosty mornings, (such as we call Rome frosts) you shall finde drops of Dew upon the inside of Glafs-windows: And the Frost it fell upon the ground, is but a Version or Condenfation of the moist vapors of the night, into a watry Subfance: Deews like wind, and Rain, are but the returns of moist vapors condensed; the Dew, by the cold only of the Sun's departure, which is the gentler cold; Rains, by the cold of that which they call the Middle Region of the Air, which is the more violent Cold.

It is very probable (as hath been touched) that that which will turn Water into Ice, will likewise turn Air some degree nearer unto Water. Therefore try the Experiment of the Artificial turning Water into Ice (whereof we shall speak in another place) with Air in place of Water, and the
the Ice about it. And although it be a greater alteration to turn Air into Water, than Water into Ice; yet there is this hope, that by continuing the Air longer time, the effect will follow; for that artificial conversion of Water into Ice, is the work of a few hours; and this of Air may be tried by a moneth's space, or the like.

Induration or Lapidification of Substances more soft, is likewise another degree of Condensation, and is a great alteration in Nature. The effecting and accelerating thereof, is very worthy to be enquired it is effected by three means.

The first is by Cold, whose property is to condense, and consolute, as hath been said.

The second is by Heat, which is not proper but by consequence; for the heat doth attenuate, and by attenuation doth send forth the Spirit, and moister part of a Body; and upon that, the more gros of the tangible parts do contract and serve themselves together; both to avoid Vacuum (as they call it) and allo to munite themselves against the force of the Fire, which they have suffered.

And the third is by Assimilation, when a hard Body assimilateth a soft, being contiguous to it.

The examples of Induration taking them promiscuously, are many: As the Generation of Stones within the Earth, which at the first are but Rude Earth or Clay; and fo of Minerals, which come (no doubt) at first of Juycs Concrete, which afterward indurate: And so of Porcelain, which is an Artificial Cement, buried in the Earth a long time; and so the making of Brick and Tile; also the making of Glass of a certain Sand and Brake-Roots; and some other matters; also the Exudation of Rock Diamonds and Crystal, which harden 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 we will speak of them distinctly.

For Indurations by Cold, there be few Trials of it; for we have no strong or intense cold here on the surface of the Earth, so near the Beams of the Sun and the Heavens, the likeliest trial is by Snow and Ice; for as Snow and Ice, especially being holpen, and their cold activated by Nitre or Salt, will turn Water into Ice, and that in a few hours: So it may be it will turn Wood or stiff Clay into Stone in longer time. Put therefore into a Containing Pit of Snow and Ice, (adding some quantity of Salt and Nitre) a piece of Wood, or a piece of tough Clay, and let it lie a moneth or more.

Another trial is by Metalline Waters, which have virtual Cold in them. Put therefore Wood or Clay into Smithy water, or other Metalline water, and try whether it will not harden in some reasonable time. But I understand it of Metalline Waters, that come by washing or quenching, and not of Strong Waters that come by dissolution; for they are too Corrosive to conludate.

It is already found, that there are some Natural Spring-waters that will inlapidate Wood; so as you shall see one piece of Wood, whereof the part above the Water shall continue Wood; and the part under the Water, shall be turned into a Kinde of Gravelly Stone. It is likely those Waters are of some Metalline Mixture; but there would be more particular inquiry made of them. It is certain, that an Egg was found, having lain many years in the bottom
bottom of a Moat, where the Earth had somewhat overgrown it: And this Egg was come to the hardness of a Stone, and had the colours of the White and Yolk perfect; and the Shell shining in small Grains, like Sugar or Albaster.

Another Experience there is of Induration by Cold, which is already found, which is, That Metals themselves are hardened by often heating, and quenching in Cold water: For Cold ever worketh most potently upon Heat precedent.

For Induration by Heat, it must be considered, That Heat, by the exhalation of the moisier parts, doth either harden the Body; as in Bricks, Tiles, &c. Or if the Heat be more fierce, maketh the graver part of itself, run and melt; as in the making of ordinary Glass, and in the Vitrification of Earth, (as we see in the inner parts of Furnaces) and in the Vitrification of Brick, and of Metals. And in the former of these, which is the hardning by Baking, without Melting, the Heat hath these degrees: First, It Indurareth, and then maketh Fragile; and lastly, It doth Incinurate and Calcinate.

But if you desire to make an Induration with Toughness, and let its Fragility, a middle way would be taken, which is that which Aristotle hath well noted, but would be thoroughly verified. It is, to decoct Bodies in Water for two or three days; but they must be such Bodies, into which the Water will not enter; as Stone and Metal. For if they be Bodies, into which the Water will enter, then long steeping will rather soften than harden them, as hath been tried in Eggs, &c. Therefore, softer Bodies must be put into Bottles, and the Bottles hung into Water steeping, with the Mouths open above the Water, that no Water may get in: For by this Means, the Virtual Heat of the Water will enter; and such a Heat, as will not make the Body apt or fragile: But the Substance of the Water will be shut out. This Experiment we made, and it stood thus, It was tried with a piece of Free-stone, and with Pewter, put into the Water at large; the Free-stone we found received in some Water; for it was softer and easier to scrape, than a piece of the same Stone kept dry. But the Pewter, into which no Water could enter, became more white, and liker to Silver, and was flexible by much. There were also put into an Earthen Bottle, placed as before, a good pellet of Clay, a piece of Cheefe, a piece of Chalk, and a piece of Free-stone. The Clay came forth almost of the hardness of Stone: The Cheefe likewise very hard, and not well to be cut: The Chalk and the Free-stone much harder then they were. The colour of the Clay inclined not a whit to the colour of Brick, but rather to white, as in ordinary drying by the Sun. Note, that all the former tryals were made by a boylung upon a good hot fire, renewing the Water as it consumed, with other hot Water; but the boylung was but for Twelve hours only: And it is like, that the Experiment would have been more effectual, if the boylung had been for two or three days, as we prescribed before.

As touching Asfimilation (for there is a degree of Asfimilation, even in Inanimate Bodies) we see examples of it in some Stones, in Clay grounds, lying near to the top of the Earth where Pebble is; in which you may manifestly see divers Pebbles gathered together, and a crust of Cement or Stone between them, as hard as the Pebbles themselves. And it were good to make a tryal of purpose, by taking Clay, and putting in it divers Pebble-stones, thick set, to see whether in continuance of time, it will nor be harder than other Clay of the same lump, in which no Pebbles are set. We see also in Ruins of
Natural History;

of old Walls, especially towards the bottom, the Morter will become as hard as the Brick: We see also, that the Wood on the sides of Vessels of Wine, gathereth a coat of Tar tar harder than the Wood it self; and Scales likewise grow to the Teeth, harder than the Teeth themselves.

Moll of all, Investigation by Assimilation appeareth in the bodies of Trees, and Living Creatures: For no nourishment that the Tree receiveth, or that the Living Creature receiveth, is so hard as Wood, Bone, or Horn, &c. but is indurated after by Assimilation.

The Eye of the Understanding, is like the Eye of the Sense: For as you may see great objects through small Cranes, or Levels; so you may see great Axioms of Nature, through small and contemptible instances. The speedy depredation of Air upon watry moisture, and version of the same into Air, appeareth in nothing more visible than in the sudden discharge, or vanishing of a little Cloud of Breath, or Vapor, from Glasses or the Blade of a Sword, or any such polished Body, such as doth not at all detain or imbibe the moisture: For the mistiness scattereth and breaketh up suddenly. But the like Cloud, if it were oily or fatty, will not discharge; nor because it sticketh faster, but because Air preseth upon Water, and Fire, upon Oil; and therefore, to take out a pot of Grease, they use a Coal upon brown Paper, because fire worketh upon Grease or Oyl, as Air doth upon Water. And we see Paper oiled, or Wood oiled, or the like, last long moist; but wet with Water, dry or putrefie sooner. The cause is, for that Air meddlieth little with the moisture of Oyl.

There is an admirable demonstration in the same trifling instance of the little Cloud upon Glasses, or Gems, or Blades of Swords of the force of Union, even in the least quantities, and weakest Bodies, how much it conduceth to preservation of the present form, and the resilling of a new. For mark well the discharge of that Cloud, and you shall see it ever break up, first in the skirts, and last in the midst. We feel likewise, that much Water draweth forth the Juice of the Body infused, but little Water is imbied by the Body: And this is a principal cause, why, in operation upon Bodies, for their Version or Alteration, the trial in great quantities doth not anower the trial in small, and doth deceiveth many; for that (I say) the greater Body refieth more any alteration of Form, and requireth far greater strength in the Active Body that should subdue it.

We have spoken before in the Fifth Instance, of the cause of Orient Colours in Birds; which is by the finenes of the Strainer, we will now endeavor to reduce the same Axiom to a Work. For this Writing of our Sylva Sybarum, is (to speak properly) not Natural History, but a high kinde of Natural Magick. For it is not a describition only of Nature, but a breaking of Nature, into great and strange Works. Try therefore the anointing over of Pigeons, or other Birds, when they are but in their Down, or of Whelps, cutting their Hair as short as may be, or of some other Beast; with some oynment, that is not hurtful to the flesh, and that will harden and fick very close, and see whether it will not alter the colours of the Feathers, or Hair. It is received, that the pulling off the first Feathers of Birds clean, will make the new come forth White: And it is certain, that White is a penurious colour, and where moisture is scant. So Blew Violets, and other Flowers, if they be darded, turn pale and white.
Birds, and Horses, by age or fears, turn white; and the hoar Hairs of Men, come by the same reason. And therefore in Birds, it is very likely, that the Feathers that come first, will be many times of divers colours, according to the nature of the Birds; for that the skin is more porous, but when the skin is more shut and close, the Feathers will come white. This is a good Experiment, not only for the producing of Birds and Beasts of strange colours, but also, for the disclosure of the nature of colours themselves, which of them require a finer porosity, and which a grolter.

It is a work of providence that hath been truly observed by some: that the Yolk of the Egg 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 Yolk remaining. And it is needful, that Birds that are hatched without the Females Womb, have in the Egg, as well matter of nourishment, as matter of generation for the Body. For after the Egg is laid, and severed from the body of the Hen, it hath no more nourishment from the Hen, but onely a quickening heat when the fittenth. But Beasts and Men need not the matter of nourishment within themselves, because they are hatched within the Womb of the Female, and are nourished continually from her body.

It is an inveterate and received opinion, That Condrades applied to any part of the Body, touch the Bladder, and exulcerate it, if they stay on long. It is likewise received, that akinde of Stone, which they bring out of the Welf-Indies, hath apeculiar force to move Gravel, and to dissolve the Stone; infomuch, as laid but to the Wrelt, it hath so forcibly sent down Gravel, as Men have been glad to remove it, it was so violent.

It is received and confirmed by daily experience, that the Soals of the Feet, have great affinity with the Head, and the Mouth of the Stomack: As we see, Going wethecd, to those that use it not, affeceth both; Applications of hot Powders to the Feet, attenuate first, and after dry the Rheume. And therefore a Physician that would be mystical, prescribeth for the cure of the Rheume, That a Man should walk continually upon a Camomill-Alley, meaning, that he should put Camomill within his Socks. Likewise, Pigeons bleeding, applied to the Soals of the Feet, ease the Head; and Poriferous Medicines applied unto them, provoke sleep.

It feemeth, that as the Feet have a sympathy with the Head; so the Wrelts and Hands have a sympathy with the Heart. We see the affects and Passions of the Heart, and Spirits, are notably discloseyed by the Pulse: And it is often tried, that Juices of Stock-gilly-flowers, Rose-campion, Carlick, and other things, applied to the Wrelts, and renewed, have cured long Agues. And I conceive, that washing with certain Liquors the Palms of the Hands, doth much good: And they do well in Heats of Agues to hold in the Hands, Eggs of Alabaster, and Balls of Cristal.

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

The knowledge of Man (hitherto) hath been determined by the view or sight, so that whatsoever is invisible, either in respect of the finenes of the Body itself, or the smallness of the Parts, or of the subtlety of the

D Motion.
Motion, is little inquired. And yet these be the things that govern Nature principally, and without which, you cannot make any true Analysis and Indications of the proceedings of Nature. The Spirits or Pneumatics that are in all Tangible Bodies, are scarce known: Sometimes they take them for Vacuum, whereas they are the most active of Bodies: Sometimes they take them for Air, from which they differ exceedingly, as much as Wine from Water, and as Wood from Earth: Sometimes they will have them to be Natural Heat, or a Portion of the Element of Fire, whereas some of them are crude and cold: And sometimes they will have them to be the Virtues and Qualities of the Tangible Parts which they see, whereas they are things by themselves: And then, when they come to Plants and Living Creatures, they call them Souls. And such superficial speculations they have; like Prospectives that shew things inward, when they are but Paintings. Neither is this a question of words, but infinitely material in Nature: For Spirits are nothing else but a Natural Body, rarified to a Proportion, and included in the Tangible Parts of Bodies, as in an Incumbrance: And they be no less differing one from the other, than the Dente or Tangible Parts: And they are in all Tangible Bodies whatsoever, more or less, and they are never (almost) at rest. And from them, and their Motions, principally proceed Arefallion, Colligation, Concussion, Modified, Purification, Sweating, and most of the effects of Nature. For, as we have figured them in our Sapiensis Paterum, in the Table of Proserpina, you shall in the Infernal Regiment hear little doings of Pluto, but most of Proserpina: For Tangible Parts in Bodies, are stupid things, and the Spirits do (in effect) all. As for the differences of Tangible Parts in Bodies, the industry of the Chemists hath given some light in discerning by their separations, the Oily, Grude, Pure, Impure, Fine, Gross, Parts of Bodies, and the like. And the Physicians are content to acknowledge, that Herbs and Drugs have divers parts; as that Opium hath a superficiating part, and a heating part; the one moving Sleep, the other a Sweat following; and that Rubrub hath Purging parts, and Affringing parts, &c. But this whole Inquisition is weakly and negligently handled. And for the more superficial differences of the Minute parts, and the posture of them in the Body, (which also hath great effects) they are not at all touched: As for the Motions of the Minute Parts of Bodies, which do so great effects, they have not been observed at all; because they are invisible, and incur not to the 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 seen in the Sun. As you (faith he) necessitate Rationis & Experimentis, effer commissurum: As you enim nonum nunquam vidisti. And therefore the tumult in the parts of solid Bodies, when they are compressed, which is the cause of all flights of Bodies throw the Air, and of other Mechanical Motions, (as hath been partly touched before, and shall be thoroughly handled in due place,) is not seen at all, but nevertheless, if you know it not, or inquire it not attentively and diligently, you shall never be able to discern, and muchless to produce, a number of Mechanical Motions. Again, as to the Motions Corporal, within the Envelopes of Bodies, whereby the effects (which were mentioned before) pass between the Spirits and the Tangible parts (which are Arefallion, Colligation, Concussion, Modified, &c.) they are not at all handled; but they are put off by the names of Virtues, and Natures, and Actions, and Passions, and such other Logical words.
I t is certain, that of all Powers in Nature, Heat is the chief; both in the Frame of Nature, and in the Works of Art. Certain it is likewise, that the effects of Heat, are most advanced, when it worketh upon a Body without loss or dissipation of the matter, for that ever betrayed the account. And therefore it is true, that the power of Heat is best perceived in Distillations, which are performed in close Vessels and Recepiacles. But yet there is a higher degree; for howsoever Distillations do keep the Body in Cells and Cloysters, without going abroad, yet they give space unto Bodies to turn into Vapor, to return into Liquor, and to separate one part from another. So as Nature doth expatiate, although it hath not full liberty; whereby the true and ultimate operations of Heat, are not attained: But if Bodies may be altered by Heat, and yet no such Reciprocity of Rarefaction, and of Condensation, and of Separation, admitted; then it is like that this Process of Matter, being held by the Sleeves, will turn and change into many Metamorphoses. Take therefore a square Vessel of Iron, in form of a Cube, and let it have good thick and strong sides; put it into a Cube of Wood, that may fill it as close as may be, and let it have a cover of Iron as strong (at least) as the sides, and let it be well Luted, after the manner of the Chemists; then place the Vessel within burning Coals kep quick kindled, for some few hours space; then take the Vessel from the Fire, and take off the Cover, and see what becomes of the Wood, I conceive, that since all Inflammation and Evaporation are utterly prohibited, and the Body full turned upon it self, that one of these two Effects will follow. Either that the Body of the Wood will be turned into a kind of Amalgama, (as the Chemists call it,) or, that the finer part will be turned into Air, and the grosser stick as it were baked, and incrustate upon the sides of the Vessel, being become of a denser matter, than the Wood itself, crude. And for another trial, take also Water, and put it in the like Vessel, stopped as before; but use a gentler Heat, and remove the Vessel sometimes from the fire; and again, after some small time, when it is cold, renew the heating of it, and repeat this alteration some few times; and if you can once bring to pass, that the Water which is one of the simplest of Bodies, was changed in Colour, Odor, or Taste, after the manner of Compound Bodies, you may be sure that there is a great work wrought in Nature, and a notable entrance made in strange changes of Bodies, and productions; and also a way made to do that by Fire, in small time, which the Sun and Age do in long time. But if the admirable effects of this Distillation in close, (for so we call it,) is which like the Wombs and Matrices of Living Creatures, where nothing expirith nor laparath: We will speak fully, in the due place. Not that we aim at the making of Peracelix Pigmeyys, or any such prodigious follies; but that we know the effects of Heat will be such, as will scarce fall under the conceit of Man, if the force of it be altogether kept in.

Here is nothing more certain in Nature, than that it is impossible for any Body to be utterly annihilated; but that as it was the work of the Omnipotency of God, to make Somewhat of Nothing; So it requireth the like omnipotency, to turn Somewhat into Nothing. And therefore it is well said by an obscure Writer of the Sect of the Chemists, That there is no such way to effect the strange Transmutations of Bodies, as to endeavor and urge by all means, the reducing of them to Nothing. And herein is contained al-
so a great secret of Preservation of Bodies from change; for if you can prohibit, that they neither turn into Air, because no Air cometh to them, nor go into the bodies Adjacent, because they are utterly Heterogeneous, nor make a round and circulation within themselves; they will never change, though they be in their Nature never so perishable or mutable. We see how Flies and Spiders, and the like, get a Sepulchre in Amber, more durable than the Monument and Embalming of the Body of any King. And I conceive the like will be of Bodies put into Quick-silver. But then they must be but thin, as a leaf or a piece of Paper or Parchment; for if they have a greater crability, they will alter in their own Body, though they spend not. But of this, we shall speak more when we handle the Title of Conservation of Bodies.
Natural History

Century II.

Ulick in the Practice, hath been well pursued, and in good Variety; but in the Theory, and especially in the yielding of the Causæ of the Practice, very weakly; being reduced into certain Mystical subtleties, and not much truth. We shall therefore, after our manner, joyn the Contemplative and Active Part together.

All Sounds are either Musical Sounds, which we call Tones; whereunto there may be an Harmony, which Sounds are ever equal: As Singing, the Sounds of Stringed, and Wind Instruments, the Ringing of Bells, &c. or Imusical Sounds, which are ever unequal: Such as are the Voice in Speaking, all Whisperings, all Voices of Beasts and Birds (except they be Singing Birds;) all Percussions, of Stones, Wood, Parchment, Skins, (as in Drums) and infinite others.

The Sounds that produce Tones, are ever from such Bodies as are in their Parts and Pores equal; as well as the Sounds themselves are equal: And such are the Percussions of Metal, as in Bells; of Glass, as in the filling of a Drinking Glass; of Air, as in Mens Voices whilst they sing, in Pipes, Whistles, Organs, Stringed Instruments, &c. And of Water, as in the Nightingales Pipes of Regals, or Organs, and other Hydraulicks, which the Ancients had; and Nero did to much esteem, but are now lost. And if any Man think, that the String of the Bow, and the String of the Viol, are neither of them equal Bodies, and yet produce Tones; he is in an error. For the Sound is not created between the Bow or Plectrum, and the String, but between the String and the Air; no more than it is between the Finger or Quill, and the String in other Instruments. So there are (in effect) but three Percussions that create experiments in Confort touching Musick.
Natural History;

create Tones; Percussion of Metals (comprehending Clap, and the like) Percussions of Air, and Percussions of Water.

The Diapason or Eighth in Musick, is the sweetest Concord; in somuch, as it is in effect an Emission; as we see in Lutes that are strung in the base strings with two strings, one an Eighth above another, which make but one sound; and every Eighth Note in Ascent, (as from Eight to Fifteen, from Fifteen to Twenty two, and so in infinitum) are but scales of Diapason. The cause is dark, and hath not been rendered by any, and therefore would be better contemplated. It seemeth that Air (which is the subject of Sounds) in Sounds that are not Tones (which are all unequal as hath been said) admitth much variety; as we see in the Voices of Living Creatures, and likewise in the Voices of several Men; for we are capable to discern several Men by their Voices) and in the Conjugation of Letters, whence Articulare Sounds proceed; which of all others, are most various. But in the Sounds which we call Tones (that are ever equal) the Air is not able to cast it self into any such variety; but is forced to recur into one and the same Picture or Figure, only differing in greatness and smallness. So we see Figures may be made of Lines, crooked and straight, in infinite variety, where there is inequality; but Circles or Squares, or Triangles Equilateral, (which are all Figures of equal Lines) can differ but in greater or lesser.

It is to be noted, (the rather, lest any Man should think that there is any thing in this number of Eight, to create the Diapason) that this computation of Eight, is a thing rather received than any true computation. For a true computation ought ever to be, by distribution into equal Portions. Now there be intervenient in the rite of Eight (in Tones) two Beemols or Half-Notes; so as if you divide the Tones equally, the Eighth is but Seven whole and equal Notes: And if you subdivide that into Half-Notes, (as it is in the skips of a Lute) it maketh the number of Thirteen.

Yet this is true, That in the ordinary Rises and Falls of the Voice of Man (not measuring the Tone by whole Notes and Half Notes, which is the equal Measure) there fall out to be two Beemols (as hath been said) between the Musick and the Diapason; and this varying is natural. For if a Man would endeavor to raise or fall his Voice still by Half-Notes, like the skips of a Lute, or by whole Notes alone, without Halfs as far as an Eighth; he will not be able to frame his Voice unto it, which etheweth that after every three whole Notes, Nature requireth, for all Harmonical use, one Half-Note to be interposed.

It is to be considered, That whatsoever vertue is in Numbers, for conducting to concert of Notes, is rather to be ascribed to the Ante-number, than to the Entire-number; as namely, that the Sound returneth after Six, or after Twelve: So that the Seventh or the Thirteenth is not the Matter, but the Sixth, or the Twelfth; and the Seventh and the Thirteenth, are but the Limits and Boundaries of the Return.

The Conords in Musick which are Perfect, or Semi-perfect, between the Emission and the Diapason, are the Fifth, which is the most perfect; the Third next, and the Sixth which is more harsh: And as the Ancient esteemed, and so do my self, and some other yet, the Fourth which they call Dintesferon; as for the Tenth, Twelfth, Thirteenth, and so in infinitum, they be but Recurrences of the former; viz. of the Third, the Fifth, and the Sixth, being an Eighth respectively from them.
Century II.

For Discords, the Second and the Seventh, are of all others, the most odious in Harmony to the Sense; whereof, the one is next above the Trifon, the other next under the Diapason; which may shew, that Harmony requireth a competent distance of Notes.

In Harmony, if there be not a Discord to the Base, it doth not disturb the Harmony, though there be a Discord to the higher parts; so the Discord be not of the Two that are odious: And therefore the ordinary Concert of Four parts consisteth of an Eighth, a Fith, and a Third to the Base; but that Fifth is a Fourth to the Treble, and the Third is a Sixth. And the cause is, for that the Base striking more Air, doth overcome and drown the Treble (unless the Discord be very odious) and so hiddeth a small imperfection. For we see, that in one of the lower strings of a Lute, there foundeth not the sound of the Treble, nor any mixt sound, but only the sound of the Base.

We have no Music of Quarter Notes, and it may be, they are not capable of Harmony; for we see the Half-Notes themselves do but interpose sometimes. Nevertheless, we have some Slides or Relic Points of the Voice or Strings, as it were, continued without Notes, from one Tone to another, rising or falling, which are delightful.

The caules of that which is Pleading or ingrate to the Hearing, may receive light by that which is Pleading or ingrate to the Sight. There be two things pleasing to the sight, leaving Pictures and Shapes aside, which are but Secondary Objects, and pleafe or displeafe but in Memory; these two are Colours and Order. The pleasing of Colour symbolizeth with the Pleading of any Single Tone to the Ear; but the pleasing of Order doth symbolize with Harmony. And therefore we see in Garden-knots, and the Feet of Houses, and all equal and well answering Figures, (as Globes, Pyramids, Cones, Cylinders, &c.) how they please; whereas unequal Figures are but Deformities. And both those pleasures, that of the Eye, and that of the Ear, are but the effects of equality, good proportion, or correspondence: So that (out of question) Equality and Correspondence are the caues of Harmony. But to finde the Proportions of that Correspondence, is more absolute; whereof, notwithstanding we shall speak somewhat (when we handle Tones, in the general enquiry of Sounds).

Tones are not so apt altogether to procure Sleep, as some other sounds: As the Wind, the Purling of Water, Humming of Bees, a sweet Voice of one that readeth, &c. The caufe whereof is, for that Tones, because they are equal and slide not, do more strike and erect the Sense, than the other. And overmuch attention hindereth sleep.

There be in Music certain Figures or Tropes, almost agreeing with the Figures of Rhetorick, and with the Affections of the Mind, and other Sense. First, The Division and Quafering, which please so much in Music, have an agreement with the Glittering of Light; As the Moon-Beams playing upon a Wave. Again, the Falling from a Discord to a Concord, which maketh great sweetness in Music, hath an agreement with the Affections, which are reintegrated to the better, after some dislikes; it agreeth also with the Tart, which is soon glutteth with that which is sweet alone. The Falling from the Close or Cadence, hath an agreement with the Figure in Rhetorick, which they call Prater Expeditum; for there is a pleasure, even in being deceived. The Reports and Fuges have an agreement with the Figures in Rhetorick of Repetition and Traduction. The Triples and Changing of Times, have an agreement with the
the changes of Motions: as when Galliard time, and Measure time, are in
the Medly of one Dance.

It hath been anciently held, and observed, That the Sense of Hearing, and
the Kindes of Musick, have most operation upon Manners; as to encourage
Men, and make them warlike; to make them soft and effeminate; to make
them grave; to make them light; to make them gentle and inclined to
pity, &c. The cause is, for that the Sense of Hearing striketh the Spirits
more immediately, than the other Senses; and more incorporeally than the
Smelling: For the Sight, Taste, and Feeling, have their Organs, not of so
present and immediate access to the Spirits, as the Hearing hath.
And as for the Smelling (which indeed worketh also immediately upon the Spi-
rits, and is forcible while the object remaineth) it is with a communication
of the Breath or Vapor of the object oderate: But Harmony entering
easily, and mingling not at all, and coming with a manifest motion; doth
by custom of often affecting the Spirits, and putting them into one kind
of posture, alter not a little the nature of the Spirits, even when the ob-
ject is removed. And therefore we see, that Tunes and Airs, even in their
own nature, have in themselves some affinity with the Affections: As
there be Merry Tunes, Doleful Tunes, Solemn Tunes; Tunes inclining
Mens minde to Pity, Warlike Tunes, &c. So as it is not marvel, if they alter the Spirits, considering that Tunes have a predisposition to the Moti-
on of the Spirits in themselves. But yet it hath been noted, that though
this variety of Tunes, doth dispose the Spirits to variety of Passions, con-
form unto them: yet generally, Musick feedeth that disposition of the Spi-
rits which it findeth. We see also, that several Airs and Tunes, do please
several Nations, and Persons according to the sympathy they have with their
Spirits.

Productive hath been with some diligence inquired; and so hath the Na-
ture of Sounds, in some sort, as far as concerneth Musick, but the Na-
ture of Sounds in general, hath been superficially observed. It is one of
the subtillest pieces of Nature. And besides, I prafife, as I do advise:
Which is after long inquiry of things, immerfed in matter, to enterpose some
subject which is immaterial or less material; such as this of Sounds: To
the end, that the intellect may be rectified, and become not partial.

It is first to be considered, what great motions there are in Nature
which pass without sound or noise. The Heavens turn about in a most rapic
d motion, without noise to us perceived, though in some dreams they have
been faid to make an excellent Musick. So the motions of the Comets, and
Fiery Meteors as Stella Cadens, &c.) yield no noise. And if it be thought, that
it is the greatnesse of distance from us, whereby the sound cannot, be heard;
we see that Lightnings and Corufcations, which are near at hand, yield no
found neither; and yet in all these, there is a percussion and divifion of the
Air. The Winds in the Upper Region (which move the Clouds above
(which we call the Rack) and are not perceived below) pass without noise.
The lower Winds in a Plain, except they be strong, make no noise; but a-
mongst trees, the noise of such Winds will be perceived. And the Winds
(generally) when they make a noise, doe ever make it unequally, rising and fall-
ing; and sometimes (when they are vehement) trembling at the height of
their blast. Rain or Hail falling, though vehemently, yieldeth no noise, in
pafting through the Air, till it fall upon the Ground. Water, Houscs, or the
like. Water in a River (though a swift Stream, is not heard in the Channel,
but runneth in silence, if it be of any depth; but the very Stream upon Shallows, or Gravel, or Pebble, will be heard. And Waters, when they beat upon the Shore, or are strained, (as in the falls of Bridges) or are dashed against themselves by Winds, give a roaring noise. Any piece of Timber, or hard Body, being thrust forwards by another Body contiguous, without knocking giveth no noise. And so Bodies in weighing, one upon another, though the upper Body press the lower Body down, make no noise. So the motion of the Minute parts of any solid Body, (which is the principal cause of violent Motion, though unobserved) pallest without sound: For that sound, that is heard sometimes, is produced only by the breaking of the Air, and not by the impulsion of the parts. So it is manifest, that where the anterior Body giveth way as fast as the posterior cometh on, it maketh no noise, be the motion never so great or swift.

Air open and at large, maketh no noise, except it be sharply percutted; as in the sound of a ftring, where Air is percutted by a hard and stiff Body, and with a sharp force: For if the ftring be not strained, it maketh no noise; but where the Air is pent and strained, there breath or other blowing (which carry but a gentle percussion) suffice to create sound; as in Pipes and Wind Instruments. But then you must note, that in Recorders which go with a gentle breath, the Concave of the Pipe (were it not for the Fipple that straineth the Air much more then the simple Concave) would yield no sound. For, as for other Wind-Instruments, they require a forcible breath, as Trum- pets, Cornets, Hunters, Horns, &c. Which appeareth by the blown Checks so him that windeth them. Organs also are blown with a strong wind by the Bellows. And note again, that some kinds of Wind-Instruments are blown at a small hole in the side, which straineth the breath at the first entrance; the rather in respect of their traverse, and stop above the hole which performeth the Fipples part; as it is seen in Flutes and Fifes, which will not give sound by a blast at the end, as Recorders do, &c. Likewise in all Whiffling, you contract the Mouth; and to make it more sharp, Men sometimes use their finger.

But in open Air, if you throw a Stone or a Dart, they give no sound: No more do Bullets, except they happen to be a little hollowed in the casting; which hollowness penneth the Air: Nor yet Arrows, except they are ruffled in their Feathers, which likewise penneth the Air. As for small Whistles or Shepherds Oaten Pipes, they give a sound, because of their extreme slenderness, whereby the Air is more pent than in a wider Pipe. Again, the voices of Men and Living Creatures, pass through the Throat, which penneth the breath. As for the Jew-Harp, it is a sharp percussion, and besides hath the advantage of penning the Air in the Mouth.

Solid Bodies, if they be very softly percutted, give no sound; as when a Man treadeth very softly upon Boards. So Ghosts or Doors in fair weather, when they open softly, give no sound. And Cart-wheels squeak not when they are liquored.

The Flame of Tapers or Candles, though it be a swift motion and breaketh the Air, yet pallest without sound. Air in Ovens, though (no doubt) it doth (as it were) boil, and dilate itself, and is repercuss'd, yet it is without noise. Flame percuss'd by Air, giveth a noise; As in blowing of the Fire by Bellows, greater than if the Bellows should blow upon the Air itself. And so likewise: Flame percussing the Air strongly (as when Flame suddenly taketh and openeth) giveth a noise: So great Flames, whiles the one impelleth the other, give a bellowing sound.
There is a conceit runneth abroad, that there should be a White Powder, which will discharge a piece without noise, which is a dangerous experiment, if it should be true: For it may cause secret Murthers, but it seems to me unpossible; for if the Air pent, be driven forth and strike the Air open, it will certainly make a noise. As for the White Powder, (it any such thing be that may extinguish or dead the noise) it is like to be a mixture of Petre and Sulphure, without Coal. For Petre alone will not take fire. And if any Man think, that the sound may be extinguished or deaded, by discharging the pent Air, before it cometh to the Mouth of the Pecce, and to the open Air, that is not probable; for it will make more divided sounds: As if you should make a Cross-barrel hollow, throw the Barrel of a Pecce, it may be it would give several sounds, both at the Noie and the sides. But I conceive, that if it were possible to bring to pass, that there should be no Air pent at the Mouth of the Pecce, the Bullet might sli with small or no noise. For first it is certain, there is no noise in the Percussion of the Flame upon the Bullet. Next the Bullet, in piercing throw the Air, maketh no noise, as hath been said; and then, if there be no pent Air, that striketh upon open Air, there is no cause of noise, and yet the flying of the Bullet will not be fliad. For that motion (as hath been oft said) is in the parts of the Bullet, and not in the Air. So astray must be made by taking some small Concave of Mind, no more than you mean to fill with Powder, and laying the Bullet in the Mouth of it sli out in the open Air.

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

I suppose that Impression of the Air with Sounds, asketh a time to be conveyed to the Sense, as well as the Impression of Species visible, or else they will not be heard. And therefore, as the Bullet moveth to swift, that it is invisible, so the same swiftness of motion maketh it inaudible; for we fee that the apprehension of the Eye, is quicker then that of the Ear.

All Eruptions of Air, though small and slight, give an entity of sound, which we call Crackling, Puffing, Sprinking, &c. As in Bay-fair, and Bay-leaves cast into the fire; so in Chefsins, when they leap forth of the Ashec, so in green wood laid upon the fire, especially Roots; so in Candles that spit flame, if they be wet; so in Raspings, Sneezing, &c. So in a Rofe leaf gathered together into the fashion of a Purfe, and broken upon the Forehead, or Back of the Hand, as Children use.

The cause given of Sound, that it should be an Elision of the Air (whereby, if they mean any thing, they mean Cutting or Dividing, or else an Attenuating of the Air) is but a term of Ignorance; and the motion is but a catch of the Wit upon a few Instances, as the manner is in the Philosophy received. And it is common with Men, that if they have gotten a pretty expression by a word of Art, that expression goeth current, though it be empty of matter. This conceit of Elision, appeareth most manifestly to
to be false, in that the Sound of a Bell string, or the like, continued melting, sometime after the Percussion; but cealeth straight-ways, if the Bell or String be touched and stayed; whereas, if it were the Elision of the Air, that made the Sound, it could not be that the touch of the Bell or String, should extinguish to suddenly that motion, caused by the Elision of the Air. This appeareth yet more manifeftly, by Chiming with a Hammer upon the outside of a Bell; for the Sound will be according to the inward Concave of the Bell: Whereas the Elision or Attenuation of the Air cannot be, but only between the Hammer, and the outside of the Bell. So again, if it were an Elision, a broad Hammer, and a Bodkin, struck upon Metal, would give a diverse Tone, as well as a diverse Loudness: But they do not so; for though the Sound of the one be louder, and of the other softer, yet the Tone is the same. Besides, in Eccho’s (whereof some are as loud as the Original Voice) there is no new Elision, but a Repercussion solely. But that, which convinceth it most of all, is, That Sounds are generated, where there is no Air atall. But these, and the like conceits, when Men have cleared their Understanding, by the light of Experience, will scatter and break up like a Mift.

It is certain, that Sounds is not produced at the firft; but with some Local Motion of the Air or Flame, or some other Medium; nor yet without some resistance, either in the Air, or the Body percuss’d. For if there be a mere yielding or effusion, it produceth no Sound, as hath been said. And therein Sounds differ from Light or Colours which pass through the Air, or other Bodies, without any Local Motion of the Air, either at the first, or after. But you must attentively distinguish between the Local Motion of the Air (which is but Vehiculum causa, A Carrier of the Sounds) and the Sounds themselves conveighed in the Air. For as to the former, we see manifeftly, that no Sound is produced (no not by Air it self against other Air, as in Organs, &c.) but with a perceptible Bifl of the Air, and with some resistance of the Air strucken. For, even all Speech, (which is one of the gentleft Motions of Air,) is with expulsion of a little Breath. And all Pipes have a blast, as well as a Sound. We see also manifeftly, that Sounds are carri’d with Wind: And therefore Sounds will be hard further with the Wind, than against the Wind; and likewise, do rise and fall with the intention or removal of the Wind: But for the Impression of the Sound, it is quite another thing; and is utterly without Local Motion of the Air, perceptible; and in that resembleth the species visible: For after a Man hath lured, or a Bell is rung, we cannot discern any Perceptible Motion (at all) in the Air, as long as the sound goeth, but only at the firft. Neither doth the Wind (as far as it carrieth a Voice) with the Motion thereof, confound any of the delicate, and Articulate figurations of the Air, in variety of Words. And if a Man speak a good loudnesse against the Flame of a Candle, it will not make it tremble much; though most, when those Letters are pronounced, which contract the mouth, as F, S, V, and some others. But gentle breathing, or blowing without speaking, will move the Candle far more. And it is the more probable, that Sound is without any Local Motion of the Air, because as it differeth from the light, in that it needeth a Local Motion of the Air at firft: So it paralleleth in so many other things with the sight, and radiation of things invisible, which (without all question) induce no Local Motion in the Air, as hath been said.

Nevertheless it is true, that upon the noise of Thunder, and great Ordinance, Glass Windows will shake, and Fishes are thought to be strayed with the
the Motion, caused by noise upon the Water. But those effects are from
the local motion of the Air, which is a concomitant of the Sound (as hath
been said) and not from the Sound.

It hath been anciently reported, and is still received, that extreme appla,
uses, and shouting of people, assembled in great multitudes, have for bar,
hed, and broken the Air, that Birds flying over, have fallen down, the Air be
ing not able to support them. And it is believed by some, that great Ring
ning of Bells in populous Cities, hath chafed away Thunder; and also disti,
lipated pestilent Air: All which may be also from the concussion of the Air, and
not from the Sound.

A very great sound near hand, hath strucken many deaf; and at the
instant they have found, as it were, the breaking of a Skin of Parchment in
their Ear: And myself, standing near one that heard loud and shrill, had
suddenly an offence, as if somewhat had broken, or been dislocated in my
Ear, and immediately after a loud Ringing; (not an ordinary Singing, or
Hissing, but far louder, and differing; so as I feared some Deafness: But
after some half quarter of an hour, it vanished. This effect may be truly
referred unto the Sound; for (as is commonly received) an overpotent
Object both destroy the Sense; and Spiritual Species, (both Visible and
Audible,) will work upon the sensories, though they move not any other
Body.

In Delation of Sounds, the enclosure of them preserveth them, and
caulfeith them to be heard further. And we finde in Rows of Parchment, or
Truncks, the Mouth being laid to the one end of the Row of Parchment,
or Trunk, and the Ear to the other, the Sound is heard much further then
in the open Air. The cause is, for that the Sound spendeth, and is dissipated
in the open Air; but in such Concaves, it is conveyed and contracted. So
also in a Piece of Ordnance, if you speak in the Touch-hole, and another
lay his Ear to the Mouth of the Piece, the Sound pasteth, and is far better
heard than in the open Air.

It is further to be considered, how it proveth and worketh when the
Sound is not enclosed, all the length of his way, but pasteth partly through
open Air; as where you speak some distance from a Trunck; or where the
Ear is some distance from the Trunck, at the other end; or where both
Mouth and Ear are distant from the Trunck. And it is tried, that in a long
Trunck of some Eight or ten foot, the sound is holpen, though both the
Mouth, and the Ear be a handful or more, from the ends of the Trunck; and
somewhat more holpen, when the Ear of the Hearer is near, than when the
Mouth of the Speaker. And it is certain, that the Voice is better heard in a
Chamber from abroad, than abroad from within the Chamber.

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

It would be tried, how, and with what proportion of disadvantage,
the Voice will be carried in an Horn, which is a Line Arched; or in a
Trumpet, which is a Line Retorted; or in some Pipe that were Sin
uous.
It is certain, (howsoever it cross the received opinion) that Sounds may be created without Air, though Air be the most favorable different of Sounds. Take a Vessel of Water, and knap a pair of Tongs some depth within the Water, and you shall hear the Sound of the Tongs well, and not much diminished, and yet there is no Air at all present.

Take one Vessel of Silver, and another of Wood, and fill each of them full of water, and then knap the Tongs together as before, about a handful from the bottom, and you shall finde the Sound much more resounding from the Vessel of Silver, than from that of Wood; and yet if there be no Water in the Vessel, so that you knap the Tongs in the Air, you shall finde no difference between the Silver, and the Wooden Vessel, whereby beside the main point of creating sound without Air, you may collect two things; the one, that the sound communicateth with the bottom of the Vessel; the other, that such a communication passeth far better thorow Water than Air.

Strike any hard Bodies together in the midst of a flame, and you shall hear the sound with little difference, from the sound in the Air.

The Pneumatical part, which is in all Tangible Bodies, and hath some affinity with the Air, performeth in some degree, the parts of the Air; as when you knock upon an empty Barrel, the sound is (in part) created by the Air on the outside, and (in part) by the Air in the inside; for the sound will be greater or lesser, as the Barrel is more empty, 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 cometh to pass in the chiming of Bells, on the outside, where also the sound passeth to the inside; and a number of other like iniances, whereof we shall speak more when we handle the Communication of Sounds.

It were extrem groaths to think, (as we have partly touched before) that the sound in Strings is made, or produced between the Hand and the String, or the Quill and the String, or the Bow and the String: For those are but vehicula move, passages to the Creation of the sound, the sound being produced between the String and the Air, and that not by any impulsion of the Air, from the first Motion of the String; but by the return or resulf of the String, which was strained by the touch to his former place; which Motion of Result is quick and sharp, whereas the first Motion is soft and dull. So the Bow tortured the String continually, and thereby holdeth it in a continual Trepidation.

Take a Trunk, and let one whistle at the one end, and hold your ear at the other and you shall finde the sound strike so sharp, as you can scarce endure it. The cause is, for that sound diffuseth it self in round, and so endeth itself: But if the sound, which would scatter in open Air, be made to go all into a Canal: it must needs give greater force to the sound. And so you may note, that inclosures do not onely preserve sound, but also encrease and sharpen it.

A Hunter's Horn, being greater at one end, than at the other, doth encrease the sound more, than if the Horn were all of an equal bore. The cause is, for that the Air and Sound, being first contracted at the lesser end, and afterwards having more room to spread at the greater end, do dilate themselves; and in coming out, strike more Air, whereby the sound is the greater, and bolder. And even Hunters Horns, which are sometimes
made straight, and not oblique, are ever 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 filling into a straight concave again.

There is in St. James's Fields, a Conduit of Brick, unto which joineth a low Vault; and at the end of that, a round House of Stone; and in the Brick Conduit there is a Window, and in the round House a Sir or Riff of some little breadth: if you try out in the Riff, it will make a fearful roaring at the Window. The cause is the same with the former: For that all Conduits that proceed from more narrow to more broad, do amplify the Sound at the coming out.

Hawks Bells that have holes in the sides, give a greater ring, than if the Pellet did strike upon Brass in the open Air. The cause is the same with the first instance of the Trunck: Namely, for that the Sound, enclosed with the sides of the Bell, cometh forth at the holes unspent and more strong.

In Drums, the cloafs of sound about, that prefereth the Sound from dispersing, maketh the noise come forth at the Drum-hole, far more loud and strong, than if you should strike upon the like skin, extended in the open Air. The cause is the same with the two precedent.

Sounds are better heard, and further off in an Evening, or in the Night, than at the Noon or in the Day. The cause is, for that in the Day, when the Air is more thin (no doubt) the Sound pierceth better; but when the Air is more thick (as in the Night) the Sound spendeth and spreadeth abroad less; and so it is a degree of Enclosure. As for the night, it is true also, that the general silence helpeth.

There be two kindes of Reflections of Sounds: the one at Distance, which is the Eecho, wherein the original is heard distinctly, and the Reflexion also distinctly; of which, we shall speake hereafter. The other in Concurrency; when the Sound reflecting (the Reflexion being near at hand) returneth immediately upon the original, and so iterateth it not, but amplifieth it. Therefore we see, that Musick upon the Water soundeth more; and so likewise, Musick is better in Chambers Wainscotted than Hanged.

The Strings of a Lute, or Viol, or Virginals, do give a far greater Sound, by reason of the Knot, and Board, and Concave underneath, than if there were nothing but only the Flute of a Board, without that Hollow and Knot, to let in the upper Air into the lower. The cause is, the Communication of the upper Air with the lower, and penning of both from expense or dispersing.

An Irish Harp hath open Air on both sides of the Strings; and it hath the Concave or Belly, not the long Strings, but at the end of the Strings. It maketh a more resounding Sound, than a Bandora, Orpharion, or Cistern, which have likewise Wire-strings. I judge the cause to be, for that open Air on both sides helpeth, so that there be a Concave; which is therefore best placed at the end.

In a Virginal, when the Lid is down, it maketh a more exile Sound than when the Lid is open. The cause is, for that all shutting in of Air, where there is no competent Vent, dampeth the Sound; which maintaineth likewise the former instance: For the Belly of the Lute, or Viol, doth open the Air somewhat.
There is a Church at Gloucester, (and as I have heard, the like is in some other places) where if you speak against a Wall softly, another shall hear your voice better a good way off, than near hand. Inquire more particularly of the fame of that place. I suppose there is some Vault, or Hollow, or Hole, behind the Wall, and some passage to it, towards the further end of that Wall against which you speak: So as the voice of him that speaketh slideth along the Wall, and then entrench at some passage, and communicateth with the Air of the Hollow; for it is preferred somewhat by the plain Wall; but that is too weak to give a Sound audible, till it hath communicated with the back Air.

Strike upon a Bow-string, and lay the Horn of the Bow near your Ear, and it will increase the Sound, and make a degree of a Tone. The cause is for that the fenlory, by reason of the close holding is percussed, before the Air dispereth. The like is, if you hold the Horn betwixt your Teeth. But that is a plain Dilution of the Sound, from the Teeth to the Infrumment of Hearing; for there is a great intercourse between those two parts, as appeareth by this, that a hard grating Tuneteth the Teeth one edge. The like fallethout, if the Horn of the Bow be put upon the Temples; but that is but the slide of the Sound from thence to the ear.

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

I remember in Trinity-Colledge in Cambridge, there was an upper Chamber, which being thought weak in the Roof of it, was supported by a Pillar of Iron, of the bigness of one's arm, in the midst of the Chamber, which, if you had struck, it would make a little flat noise in the Room where it was struck; but it would make a great bomb in the Chamber beneath.

The sound which is made by Buckets in a Well, when they touch upon the Water, or when they strike upon the side of the Well, or when two Buckets daff the one against the other. These Sounds are deeper and fuller, than if the like Percussion were made in the open Air. The cause is the penning and enclosure of the Air in the Concave of the Well.

Barrels placed in a Room under the Floor of a Chamber, make all noises in the same Chamber more full and resounding.

So that there be five ways (in general) of Majoration of Sounds, Enclosure Simple, Enclosure in the Dilatation, Communication, Reflection, Concurrent, and Approach to the Sensory.

For Exility of the Voice, or other Sounds: It is certain, that the Voice doth pass thorow solid and hard Bodies, if they be not too thick; and thorow Water, which is likewise a very close Body, and such an one as leteth not in Air. But then the Voice or other Sound is reduced, by such passage to a great weaknes or exilty. If therefore you stop the Holes of a Hark's Bell, it will make no ring, but a flat noise or rattle. And so doth the Emisses or Eagle Stone, which hath a little stone within it.

And as for Water, it is a certain Tryal: Let a mango into a Bath, and take a Pail and turn the bottom upward, and carry the mouth of it (even) down to the level of the Water, and so press it down under the Water some handful and an half, still keeping it even; that it may not tilt on either side, and so the Air get out: Then let him that is in the Bath, dive

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with his head so far under Water, as he may put his head into the Pail, and there will come as much Air bubbling forth, as will make room for his head. Then let him speak, and any that shall stand without, shall hear his voice plainly, but yet made extreme sharp and exile, like the voice of Puppets: But yet the Articulate Sounds of the words will not be confounded. Note, that it may be much more handomely done, if the Pail be put over the Mans head above Water, and then he cowre down, and the Pail be pressed down with him. Note, that a man must kneel or sit, that he may be lower than the Water. A man would think, that the Sicilian Poet had knowledge of this Experiment; for he saith, that Hercules's Page Hylas went with a Water-pot, to fill it at a plesant Fountain that was near the shore, and that the Nymphs of the Fountain fell in love with the Boy, and pulled him under the Water, keeping him alive; and that Hercules missing his Page, called him by his name aloud, that all the shore rang of it; and that Hylas from within the Water answered his Master; but (that which is to the present purpose) with so small and exile a voice, as Hercules thought he had been three miles off, when the Fountain (indeed) was fall by.

In Lutes and Instruments of Strings, if you stop a string high, whereby it hath leas scope to tremble, the Sound is more Treble, but yet more dead.

Take two Sawcers, and strike the edge of the one against the bottom of the other, within a Pail of Water, and you shall finde that as you put the Sawcers lower and lower, the Sound growth more flat, even while part of the Sawcer is above the Water; but that flatness of Sound is joyned with a harthness of Sound, which, no doubt, is caused by the inequality of the Sound, which cometh from the part of the Sawcer under the Water, and from the part above. But when the Sawcer is wholly under the Water, the sound becometh more clear, but far more low, and as if the sound came from a far off.

A soft body dampeth the sound, much more than a hard; and if a Bell hath cloth or silk wrapped about it, it deadeth the sound more than if it were wood. And therefore in Clericals, the Keyes are lined, and in Colledges they use to line the Table-men.

Tryal was made in a Recorder after these several manneres. The bottom of it was set against the Palm of the Hand, stopped with Wax round about, set against a Damask Cushion, thrust into Sand, into Ashes, into Water, (half an inch under the Water,) close to the bottom of a Silver Basin, and still the Tone remained: But the bottom of it was set against a Woollen Carpet, a Lining of Plufh, a Lock of Wool. (though loosely put in;) against Snow, and the sound of it was quite deaded, and but breath.

Iron hot produceth not so full a sound, as when it is cold; for while it is hot, it appeareth to be more soft, and less refunding. So likewise warm Water, when it faileth maketh not so full a sound as cold; and I conceive it is softer, and nearer the nature of Oyl; for it is more slippery, as may be perceived, in that it cowreth better.

Let there be a Recorder made with two Fiddles at each end one; the Trunck of it of the length of two Recorders, and the holes answerable towards each end, and let two play the same Lesson upon it, at an Unison; and let it be noted, whether the sound be confounded, or amplified, or dulled. So likewise let a Cross be made of two Truncks (thorowout) hollow,
hollow; and let two speak or sing, the one long ways the other traverse. And let two hear at the opposite ends; and note, whether the Sound be confounded, amplified, or dulled. Which two instances will also give light to the mixture of Sounds, whereof we shall speak hereafter.

A Bellow, blown into the hole of a Drum, and the Drum then struck, 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 Air being blown together, less movable.

The Loudness and Softness of Sounds, is a thing distinct from the Magnitude and Easility of Sounds; for a Base-string, though softly strucken, giveth 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 Air; and the Treble leis Air, but with a sharper percussion.

It is therefore the strength of the Percussion, that is a principal cause of the loudness or softness of Sounds: As in knocking, harder or softer; Winding of a Horn, stronger or weaker; Ringing of an Hand bell, harder or softer, &c. And the strength of this Percussion consisteth, as much or more, in the hardness of the Body percussed, as in the force of the Body percussing: For if you strike against a Cloth, it will give a less sound; it against Wood, a greater; it against a Metal, yet a greater; and in Metals, if you strike against Gold, (which is the more pliant) it giveth the slatter sound; if against Silver or Brass, the more ringing sound. As for Air, where it is strongly pent, it maketh a hard Body. And therefore we see in discharging of a piece, what a great noise it maketh. We see also, that the Charge with Bullet, or with Paper wet, and hard dropped; or with Powder alone rammed in hard, maketh no great difference in the loudness of the report.

The sharpness or quickness of the Percussion, is a great cause of the loudness, as well as the strength: As in a Whip or Wand, if you strike the Air with it, the sharper and quicker you strike it, the louder sound it giveth. And in playing upon the Lute or Virginals, the quick stroke or touch is a great life to the Sound. The cause is, for that the quick striking curteth the Air speedily, whereas the soft striking, doth rather beat than cut.

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

The Experiment, for greatest Demonstration of Communication of Sounds, is the Chiming of Bells; where, if you strike with a Hammar upon the upper part, and then upon the midit, and then upon the lower, you shall finde the sound to be more Treble, and more Bafe, according unto the Concave on the inside, though the Percussion be only on the outside.

When the Sound is created between the Blatt of the Mouth, and the Air of the Pipe, it hath nevertheless some communication with the matter of the sides of the Pipe, and the spirits in them contained: For in a Pipe or Trumpet of Wood and Brass, the sound will be divers; so if the Pipe be covered with
with Cloth or Silk, it will give a diverse Sound from that it would do of it self; so if the Pipe be a little wet on the inside, it will make a differing Sound, from the same Pipe dry.

That Sound made within Water, doth communicate better with a hard Body thorow Water, than made in Air, it doth with Air. \textit{vide Experimentum, 154.}

We have spokken before (in the Inquisition touching \textit{Musick}) of Musical Sounds, whereunto there may be a Concord or Discord in two Parts; which Sounds we call Tones, and likewise of Immaterial Sounds; and have given the cause, that the Tone proceedeth of Equality, and the other of Inequality. And we have also expressed there, what are the Equal Bodies that give Tones, and what are the Unequal that give none. But now we shall speake of such Inequality of Sounds, as proceedeth not from the Nature of the Bodies themselves, but is accidental, Either from the Roughness or Obliquity of the Passage, or from the Doubling of the Percussion, or from the Trepidation of the Motion.

A Bell if it have a Riff in it, whereby the sound hath not a clear Passage, giveth a hoarse and jarring sound; so the Voice of Man, when by cold taken, the Wesil groweth rugged, and (as we call it) furred, becometh hoarse. And in these two instances, the Sounds are ingrate, because they are meerly unequal; but if they be unequal in equality, then the Sound is Grateful, but Purling.

All Infirmities that have either Returns, as Trumpets; or Flexions, as Cornets, or are drawn up, and put from, as Sackbutts, have a Purling Sound; But the Recorder or Flute that have none of these Inequalities, give a clear Sound. Nevertheless, the Recorder it self or Pipe, moistened a little in the inside, foundeth more solemnly, and with a little Purling or Hissing. Again, a Wreathed String, such as are in the Bass Strings of Bandoraces, giveth also a Purling Sound.

Lute a Lute-String, if it be meerly unequal in his parts, giveth a harsh and untuneable Sound, which strings we call false, being bigger in one place, than in another; and therefore Wire-strings are never false. We see also, that when we try a false Lute-string, we use to extend it hard between the Fingers, and to fillip it; and if it giveth a double Species, it is true; but if it giveth a treble or more, it is false.

Waters, in the noise they make as they run, represent to the Ear a trembling noise; and in Regals (where they have a Pipe, they call the Niphingale-Pipe, which containeth Water) the Sound hath a continual trembling. And Children have also little things they call Cocks, which have water in them; and when they blow, or whistle in them, they yield a trembling noise; which Trembling of Water, hath an affinity with the Letter L. All which Inequalities of Trepidation, are rather pleasant, than otherwise.

All Base Notes, or very Treble Notes, give an Asper Sound; for that the Base striketh more Air, than it can well strike equally; and the Treble cutteth the Air so sharp, as it returneth too swiftly, to make the Sound equal; and therefore a Mean of Tenor is the sweetest part.

We know nothing, that can at pleasure make a Musical or Immusical Sound, by voluntary Motion, but the Voice of Man and Birds. The cause is (no doubt) in the Wesil or Wind-Pipe, (which we call Asperia Arteria), which
which being well extended, gathered equality; as a Bladder that is wrinkled, if it be extended, becomes smooth. The extension is always, more in Tones, than in Speech; therefore the inward voice or whisper, can never give a Tone. And in singing, there is (manifestly) a greater working and labor of the Throat, than in speaking; as appeareth in the rustling out, or drawing in of the Chin, when singing.

The Humming of Bees is an unequal buzzing, and is conceived by some of the Ancients, not to come forth at their Mouth, but to be an inward Sound; but (it may be) it is neither, but from the motion of their Wings; for it is not heard, but when they stir.

All Metals quenched in Water, give a repulsation or hissing sound (which hath an affinity with the Letter Z.) notwithstanding the Sound be created between the Water or Vapor, and the Air. Seething also, if there be but small store of Water in a Vessel, gives a hissing sound; but boiling in a full Vessel, gives a bubbling sound, drawing somewhat near to the Cocks ufed by Children.

Tryal would be made, whether the Inequality, or interchange of the Medium, will not produce an Inequality of Sound; as if three Bells were made one within another, and Air betwixt each; and then the outermost Bell were chimed with a Hammer, how the Sound would differ from a simple Bell. So likewise take a Plate of Brass, and a Plank of Wood, and joyn them close together, and knock upon one of them, and see if they do not give an unequal Sound. So make two or three Partitions of Wood in a Hoghead, with holes or knots in them; and mark the difference of their found, from the found of an Hoghead, without such partitions.

It is evident, that the Percussion of the greater quantity of Air, causeth the bafier Sounds; and the less quantity, the more treble Sound. The Percussion of the greater quantity of Air, is produced by the greatness of the Body percussing; by the Latitude of the Concave, by which the Sound passeth, and by the Longitude of the fame Concave. Therefore we see, that a Bafe-thing is greater than a Treble; a Bafe-pipe hath a greater force than a Treble; and in Pipes, and the like, the lower the Note holes be, and the farther off from the Mouth of the Pipe, the more Bafe found they yield; and the nearer the Mouth, the more Treble. Nay more, if you strike an entire Body, as an Andiron of Brass, at the top it maketh a more Treble found, and at the bottom a Bafier.

It is also evident, that the sharper or quicker Percussion of Air, causeth the more Treble sound; and the heavier, the more Bafe found. So we see in Strings, the more they are wound up and strained (and thereby give a more quick Start back) the more Treble is the found; and the slacker they are, or less wound up, the Bafier is the found. And therefore a bigger String more strained, and a lighter String less strained, may fall into the same Tone.

Children, Women, Eunuchs, have more small and shrill Voices than Men. The reason is, not for that Men have greater heat, which may make the voice stronger, (for the strength of a Voice or Sound, doth make a difference in the loudness or softness, but not in the Tone) but from the dilatation of the Organ, which (it is true) is likewise caused by heat; but the cause of changing the voice at the years of puberty, is most obscure. It seemeth to be for that, when much of the moisture of the Body, which did before irrigate the
The just and measured Proportion of the Air percuss'd, towards the Baffeness or Trebleness of Tones, is one of the greatest secrets in the Contemplation of Sounds. For in discovering the true Coincidence of Tones into Diapasons, which is the return of the same Sound. And so of the Concorde and Discorde, between the Unison and Diapason; which we have touched before in the Experiments of Musick, but think it fit to resume it here as a principal part of our Inquiry, touching the Nature of Sounds. It may be found out in the Proportion of the Winding of Strings, in the Proportion of the Distance of Frets, and in the Proportion of the Concave of Pipes, &c. But most commodiously in the last of these.

Try therefore the Winding of a String once about, as soon as it is brought to that extension as will give a Tone, and then of twice about, and thrice about, &c. And mark the scale or difference of the Rise of the Tone, whereby you shall discover in one, two effects; both the proportion of the Sound towards the Dimension of the Winding, and the proportion likewit of the Sound towards the String, as it is more or less strained. But more that to measure this, the way will be to take the length in a right line of the String, upon any Winding about of the Peg.

As for the Stops, you are to take the number of Frets, and principally the length of the Line, from the first stop of the String, unto such a stop as shall produce a Diapason to the former stop, upon the same String.

But it will best (as it is said) appear in the Bows of Wind-Instruments; and therefore cause some half dozen Pipes to be made in length, and all things else a like, with a single double, and so one to a sextuple Bore; and so mark what fall of Tone every one giveth. But fill in these three last instances you must diligently observe, what length of String, or distance of Stop, or concave of Air, maketh what fife of Sound. As in the last of these (as we said, is that which giveth the aptest demonstration) you must set down what increas of Concave goeth to the making of a Note higher, and what of two Notes, and what of three Notes, and so up to the Diapason: For then the great secret of Numbers and Proportions will appear. It is not unlikely,
likely, that those that make Recorders, &c. know this already; for that they make them in Sets. And likewise Bell-Founders in setting the tune of their Bells: So that enquiry may save trial. Surely, it hath been observed by one of the Ancients, that an empty Barrel knocked upon with the finger, giveth a Diapason to the Sound of the like Barrel full: But how that should be, I do not well understand, for that the knocking of a Barrel full or empty, doth scarce give any Tone.

There is required some sensible difference in the Proportion of creating a Note towards the Sound it self, which is the Passive; and that it be not too near, but at a distance: For in a Recorder, the three uppermost holes yield one Tone, which is a Note lower than the Tone of the first three. And the like (no doubt) is required in the winding or stopping of Strings.

There is another difference of Sounds, which we will call Exterior and Interior. It is not Soft nor Loud; nor it is not Bass, nor Treble; nor it is not Musical, nor Immusical. Though it be true, that there can be no Tone in an Interior Sound; but on the other side, in an Exterior Sound, there may be both Musical and Immusical. We shall therefore enumerate them, rather than precisely distinguish them; though to make some adumbration of (that we mean) the Interior, is rather an Impulsion or Contusion of the Air, than an Elysion or Section of the same; so as the Percussion of the one towards the other, differeth as a Blow differeth from a Gut.

In Speech of Man, the Whispering, (which they call Susurrus in Latin,) whether it be louder or softer, is an Interior Sound; but the Speaking our, is an Exterior Sound: And therefore you can never make a Tone, nor sing in Whispering; but in Speech you may. So Breathing, or Blowing by the Mouth, Bellows, or Wind (though loud) is an Interior Sound; but the blowing thorow a Pipe, or Concave (though soft) is an Exterior. So likewise, the greatest Winds, if they have no coarstation, or blow not hollow, give any Interior Sound; the whistling or hollow Wind, yieldeth a singing, or Exterior Sound: the former being pent by some other Body, the latter being pent in his own Density: And therefore we see, That when the Wind bloweth hollow, it is a sign of Rain; the flame, as it moveth within itself, or is blown by a Bellows, giveth a murmur or Interior Sound.

There is no hard Body, but struck against another hard Body, will yield an Exterior Sound, greater or lesser; insomuch, as if the Percussion be over-soft, it may induce a nullity of sound, but never an Interior Sound; as when one treadeth so softly, that he is not heard.

Where the Air is the Percutient, pent or not pent, against a hard Body, it never giveth an Exterior Sound; as if you blow strongly with a Bellows against a Wall.

Sounds (both Exterior and Interior) may be made as well by Suction, as by emission of the Breath; as in Whistling, or Breathing.

It is evident, and it is one of the strangest secrets in Sounds; that the whole Sound is not in the whole Air only, but the whole Sound is also in every small part of the Air. So that all the curious diversity of Articulate
culate sounds of the voice of Man or Birds, will enter into a small crany, in confusion.

193. The unequal agitation of the Winds, and the like, though they be material to the carriage of the Sounds, further or less way; yet they do not confound the Articulation of them at all, within that distance that they can be heard, though it may be, they make them to be heard less way, than in a still, as hath been partly touched.

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

195. In the Experiment of speaking under Water, when the voice is reduced to such an extreme exhility, yet the Articulate sounds (which are the words) are not confounded, as hath been said.

196. I conceive that an extreme small, or an extreme great sound, cannot be Articulate, but that the Articulation requireth a mediocrity of sound: For that the extreme small sound confoundeth the Articulation by contracting, and the great sound by diluting; and although (as was formerly said) a Sound Articulate, already created, will be contracted into a small crany; yet the first Articulation requireth more-dimension.

197. It hath been observed, that in a Room, or in a Chappel, Vaulted below, and Vaulted likewise in the Roof, a Preacher cannot be heard so well, as in the like places not so Vaulted. The cause is, for that the subsequent words come on, before the precedent words vanish; and therefore the Articulate Sounds are more confounded, though the gros of the Sound be greater.

198. The motions of the Tongue, Lips, Throat, Palate, &c. which go to the making of the several Alphabetical Letters are worthy inquiry, and pertinent to the present Inquisition of Sounds: But because they are subtil and long to deferibe, we will refer them over, and place them amongst the Experiments of Speech. The Hebrews have been diligent in it, and have assigned which Letters are Labial, which Dental, which Guttural, &c. As for the Latins and Greeks, they have distinguished between Semi-vowels and Mutes; and in Mutæ, between Muta Longæ, Media, and Affirmæ, not amiss, but yet not diligently enough. For the special strokes and motions that create those Sounds, they have little enquired; as that the Letters B. P. F. M. are not exprest, but with the contracting, or flutting of the Mouth; that the Letters N. and B. cannot be pronounced, but that the Letter N. will turn into M. as Hecatombs will be Hecatomba. That M. and T. cannot be pronounced together, but P. will come between; as Enmuus, is pronounced Empius, 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.

199. The Lungs are the most spongy part of the Body, and therefore ablest to contract and dilate itself; and where it contracteth itself, it expelleth the Air, which throweth the Arise, Throat, and Mouth, maketh the Voice: But yet Articulation is not made, but with the help of the Tongue, Palate, and the rest of those they call Instruments of Voice.
There is found a Similitude between the Sound that is made by Inanimate Bodies, or by Animata Bodies, that have no Voice Articulate, and diverse Letters of Articulate Voices; and commonly Men have given such names to those Sounds as do allude unto the Articulate Letters. As Trembling of Waters hath resemblance with the Letter L. Quenching of Hot Metals with the Letter Z. Snarling of Dogs with the Letter R. The Noise of Scratching Ovbls with the Letters Sh. Voice of Cats with the Diphthong Eu. Voice of Chickens with the Diphthong Oo. Sounds of Strings with the Letters Ng. So that if a Man (for curiosity or strangeness sake) would make a Puppet, or other dead Body, to pronounce a word: Let him consider on the one part, the Motion of the Instruments of 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.
NATURAL HISTORY

Century III.

III. Sounds (whatsoever) move round, that is to say, on all sides, Upwards, Downwards, Forewards, and Backwards: This appeareth in all Instances. Sounds do not require to be conveyed to the Sense in a right Line, as Visions do, but may be arched, though it be true they move strongest in a right Line; which nevertheless is not caused by the rightness of the Line, but by the shortness of the distance. And therefore, we see if a Wall be between, and you speak on the one side, you hear it on the other; which is not because the sound passeth through the Wall, but arched over the Wall.

If the Sound be stopped and repercussed, it cometh about on the other side, in an oblique Line: So, if in a Coach, one side of the Boot be down, and the other up, and a Beggar beg on the close side, you would think that he were on the open side. So likewise, if a Bell or Clock, be (for example) on the North-side of a Chamber, and the Window of that Chamber be upon the South; he that is in the Chamber, will think the sound came from the South.

Sounds, though they spread round, so that (there is an orb, or spherical Area of the Sound) yet they move strongest, and go furthest in the Fore-Lines, from the first Local Impulsion of the Air. And therefore in Preaching, you shall hear the Preachers voice better before the Pulpit than behind it, or on the sides, though it stand open. So a Marquee, or Ordinance will be further heard forwards, from the mouth of the Piece, than backwards, or on the sides.

It may be doubted, that Sounds do move better downwards, than upwards. Fupin are placed high above the people: And when the Ancient

Experiment
in Confort, touching the Motions of Sounds, in what Lines they are Circular, Oblique, Straight, Forewards, Downwards, Forwards, Backwards.

202.

203.

204.

205.
Natural History;

General Spake to their Armies, they had ever a Mount of Turf cast up, where upon they stood. But this may be imputed to the flaps and obstacles which the voice meeteth with, when one speketh upon the level. But there seemeth to be more init; for it may be, that Spiritual Species, both of things visible, and Sounds, do move better downwards than upwards. It is a strange thing, that to Men standing below on the ground, those that be on the top of Pauls, seem much less than they are, and cannot be known; but to Men above those below, seem nothing so much lessened, and may be known; yet it is true, That all things to them above, seem also somewhat contracted and better collected into figure; as Knots in Gardens shew best from an upper Window or Tarras.

But to make an exact trial of it, let a Man stand in a Chamber, not much above the Ground, and speake out at the Window through a Trunck, to one standing on the Ground as loofly as he can, the other laying his Ear close to the Trunck: Then Passera, let the other speake below keeping the same proportion of softness; and let him in the Chamber lay his Ear to the Trunck. And this may be the aptest means to make a Judgment, whether Sounds descend or ascend better.

After that Sound is created (which is in a moment) we finde it continueth some small time, melting by little and little. In this there is a wonderful error amongst Men, who take this to be a continuance of the first Sound; whereas (in truth) it is a Renovation, and not a Continuance: For the Body percussed, hath by reason of the Percussion, a Tripidation wrouth in the minute parts, and so reneweth the Percussion of the Air. This appeareth manifestly, because that the Melting sound of a Bell, or of a string strucken, which is thought to be a Continuance, ceaseth as soon as the Bell or string are touched. As in a Virginal, as soon as ever the Jack falleth, and toucheth the string, the found ceaseth; and in a Bell, after you have chimed upon it, if you touch the Bell, the sound ceaseth. And in this you must distinguish, that there are two Tripidations, one Manifest and Local; as of the Bell, when it is Penfile; the other Secret, of the Minute parts, such as is described in the ninth Instance. But it is true, that the Local helpeth the Secret greatly. We see likewise, that in Pipes, and other Wind Instruments, the sound lasteth no longer than the breath bloweth. It is true, that in Organs there is a confused murmur for a while, after you have played, but that is but while the Bellows are in falling.

It is certain, that in the noise of great Ordnance, where many are shot off together, the sound will be carried (at the least) twenty miles upon the Land, and much further upon the Water, but then it will come to the Ear, not in the instant of the flooring off, but it will come an hour, or more later: This must needs be a Continuance of the first Sound; for there is no Tripidation which should renew it. And the touching of the Ordnance would not extinguish the sound the sooner: So that in great Sounds, the Continuance is more than Momentany.

To try exactly the time wherein Sound is delated, Let a Man stand in a Steeple, and have with him a Taper, and let some Veil be put before the Taper, and let another Man stand in the Field a mile off; then let him in the Steeple strike the Bell, and in the same instant withdraw the Veil, and so let him in the Field tell by his Pulse, what distance of time there is between the Light seen, and the Sound heard. For it is certain, That the Delation of Light
Light is in an instant. This may be tried in far greater distances, allowing greater Lights and Sounds.

It is generally known and observed, that Light and the object of Sight, move swifter than Sound; for we see the fall of a piece is keen sooner, than the noise is heard. And in hewing Wood, if one some distance off, he shall see the Arm lifted up for a second stroke, before he hear the noise of the first stroke, and the greater the distance, the greater is the prevention: As we see in Thunder, which is far off, where the Lightning precedeth the crack a good space.

Colours, when they represent themselves to the Eye, fade not nor melt not by degrees, but appear still in the same strength; but Sounds melt, and vanish, by little and little. The cause is, for that Colours participate nothing with the motion of the Air, but Sounds do. And it is a plain argument that Sound participath of some Local Motion of the Air, (as a cause sine qua non) in that it periseth so suddenly: For in every Section, or Impulsion of the Air, the Air doth suddenly restore and reunite itself, which the Water also doth, but nothing so swiftly.

In the Tryals 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 through a Body; and therefore you must make the Intercepting Body very close; for Sound will pass through a small chink.

Where Sound pasteth through a hard, or close Body (as through Water, through a Wall, through Metal, as in Hawks Bells stopped, &c.) the hard or close Body, must be but thin and small; for else it deadeth and extinguisheth the Sound utterly. And therefore, in the Experiment of Speaking in Air under Water, the voice must not be very deep within the Water, for then the Sound pierceth not. So if you speak on the further side of a close Wall, if the Wall be very thick, you shall not be heard; and if there were an Horse-head empty, whereof the sides were some two foot thick, and the Bung-hole stopped. I conceive, the confounding sound by the Communication of the outward Air with the Air within, would be little or none, but oneely you shall hear the noise of the outward knock, as if the Vessel were full.

It is certain, that in the passage of Sounds through hard Bodies, the Spirit or Pneumatical part of the hard Body itself doth co-operate; but much better, when the sides of that hard Body are struck, than when the percussion is onel within, without touch of the sides. Take therefore a Hawks Bell, the holes stopped up, and hang it by a thread within a Bottle-Glass, and stop the Mouth of the Glass very close with Wax, and then shake the Glass, and see whether the Bell give any sound at all, or how weak? But note, that you must instead of Thread take a Wire, or else let the Glass have a great Belly, lest when you shake the Bell, it dash upon the sides of the Glass.

It is plain that a very long and down right arch for the Sound to pass, will extinguish the Sound quite, so that that Sound, which would be heard over a Wall, will not be heard over a Church; nor that Sound, which will be heard, if you stand some distance from the Wall, will be heard if you stand close under the Wall.

So that Foraminous Bodies in the first creation of the Sound, will dead it; for the striking against Cloth or Fur, will make little sound, as hath been said: But in the passage of the sound, they will admit it better than harder Bodies, as we see, that Curtains and Hangings will not stay the sound much; but Glass windows, if they be very close, will check a sound more, than the like thickness of Cloth. We see also, in the rumbling of the Belly, how easily the Sound pasteth through the Guts and Skin.
It is worthy the inquiry, whether great Sounds (as of Ordnance or Bells) become not more Weak and Exile, when they pass thorow small Cranies. For the Subtilties of Articulate Sounds, (it may be) may pass thorow small Cranies, not confused; but the magnitude of the Sound (perhaps) not so well.

The Mediums of Sounds are Air, soft and porous Bodies; also Water, and hard Bodies refuse not altogether to be Mediums of Sounds. But all or them are dull and unapt different, except the Air.

In Air, the thinner or drier Air, carrieth not the Sound so well, as the more dense; as appeareth in Night Sounds, and Evening Sounds, and Sounds in moist Weather, and Southern Winds. The reason is already mentioned in the Title of Majoration of Sounds; being, for that thin Air is better pierced, but thick Air preferveth the Sound better from waste: Let further Tryal be made by hollowing in Mists, and gentle Showers; for (it may be) that will somewhat dead the Sound.

How far forth Flame may be a Medium of Sounds, (especially of such Sounds as are created by Air, and not berwixt hard Bodies) let it be tried in speaking, where a Bonefire is between; but then you must allow for some disturbance, the noise that the Flame let maketh.

Whether any other Liquors being made Mediums, caufe a diversity of Sound from Water, it may be tried: As by the knapping of the Tongs, or striking the bottom of a Vessel filled either with Milk or with Oyl; which though they be more light, yet are they more unequal Bodies than Air.

Of the Natures of the Mediums, we have now spoken; as for the Disposition of the said Mediums, is doth confist in the Penning, or not Penning of the Air; of which, we have spoken before in the Title of Delation of Sounds. It confisteth also in the Figure of the Concave, through which it passes; of which, we will speak next.

How the Figures of Pipes or Concaves, through which Sounds pass, or of other Bodies different; conduct to the variety and alteration of the Sounds, either in respect of the greater quantity, or less quantity of Air, which the Concaves receive; or in respect of the carrying of Sounds longer or shorter way; or in respect of many other Circumstances, they have been touched, as falling into other Titles. But those Figures which we now are to speak of, we intend to be, as they concern the Lines, through which Sound passeth: As Straight, Crooked, Angular, Circular, &c.

The Figure of a Bell passeth of the Pyramid, but yet coming off, and dilating more suddenly. The Figure of a Hunters Horn, and Corner, is oblick, yet they have likewise Straight Horns; which if they be of the same bore with the oblick, differ little in Sound, save that the straight require somewhat a stronger blast. The Figure of Recorders, and Flutes, and Pipes, are straight; but the Recorder hath a less bore, and greater, above 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 Hoarfe, and Jarring.

Of a Sinuous Pipe that may have some four Flexions, trial would be made. Likewise of a Pipe made like a Crofs, open in the midst; and so likewise
likewise of an Angular Pipe; and see what will be the effects of these several Sounds. And so again of a Circular Pipe: As if you take a Pipe perfect round, and make a hole whereby into you shall blow, and another hole not far from that; but with a traverse or stop between them: So that your breath may go the Round of the Circle, and come forth at the second hole. You may try likewise Percussions of solid Bodies of several Figures: As Globes, Flats, Cylinders, Crossed, Triangles, &c. And their Combinations; as Flat against Flat, and Convex against Convex, and Convex against Flat, &c. And mark well the diversities of the Sounds. Try also the difference in sound of several Crassitudes of hard Bodies percussed, and take knowledge of the diversities of the sounds. I myself have tried, That a Bell of Gold yieldeth an excellent sound, not inferior to that of Silver or Brass, but rather better. Yet we see that a piece of money of Gold, soundeth far more flat than a piece of money of Silver.

The Harp hath the concave, not along the strings, but across the strings; and no Instrument hath the sound so melting and prolonged, as the Irish Harp. So as I suppose, if a Virginal were made with a double Concave; the one all the length as the Virginal hath, the other at the end of the strings, as the Harp hath; it must needs make the sound perfecter, and not so shallow, and jarring. You may try it without any Sound-board along, but only Harp wife, at one end of the strings; or lastly, with a double concave, at each end of the strings one.

Here is an apparent diversity between the Species Visible and Audible, in this. That the Visible doth not mingle in the Medium, but the Audible doth. For if we look abroad, we see Heaven, a number of Stars, Trees, Hills, Men, Beasts, at once; and the Species of the one, doth not confound the other: But if so many Sounds come from several parts, one of them would utterly confound the other. So we see, That Voices or Conforts of Music do make a harmony by mixture, which Colours do not. It is true nevertheless, that a great light drownesth a smaller, that it cannot be seen; as the Sun that of a Glowworm, as well as a great sound drowneth a letter. And I suppose likewise, that if there were two Lanthorns of Glass, the one a Crimson, and the other an Azure, and a Candle within either of them, those coloured lights, would mingle and cast upon a White Paper, a Purple colour. And even in colours, they yield a faint and weak mixture; for White Walls make rooms more lightsome, than Black, &c. But the cause of the Confusion in Sounds, and the Inconfusion in Species Visible, is, For that the Sight worketh in right Lines, and maketh several Cones; and so there can be no Coincidence in the Eye, or Visual Point: But Sounds that move in oblique and arcuate Lines, must needs encounter, and disturb the one the other.

The sweetest and best Harmony is, when every Part or Instrument is not heard by itself, but a conjunction of them all, which requireth to stand some distance off. Even as it is in the mixture of perfumes, or the taking of the smell of several Flowers in the Air.

The disposition of the Air, in other qualities, except it be joyned with Sound, hath no great operation upon Sounds: For whether the Air be lightsome or dark, hot or cold, quiet or flirtling, (except it be with noise) sweet smelling, or thinking, or the like; it importeth not much. Some petty alteration or difference it may make.
But Sounds do disturb and alter the one the other: Sometimes the one drowning the other, and making it not heard; sometimes the one jarring and discording with the other, and making a confusion; sometimes the one mingling and compoundung with the other, and making an harmony.

Two Voices of like loudness, wilt not be heard twice as far, as one of them alone; and two Candles of like light, will not make things seem twice as far off, as one. The cause is profound, but it seemeth, that the Impressions from the objects of the Sense, do mingle respectively, every one with his kind; but not in proportion, as is before demonstrated: And the reason may be, because the first impression, which is from Prativie to Active, (as from Silence to Noise, or from Darkness to Light,) is a greater degree, than from less noise, to more noise, or from less light, to more light. And the reason of that again may be, For that the Air, after it hath received a charge, doth not receive a surcharge, or greater charge, with like appetite, as it doth the first charge. As for the increase of Virtue generally, what proportion it beareth to the increase of the Matter, it is a large Field, and to be handled by it self.

All Reflections Concurrent, do make Sounds greater; but if the Body that createth, either the original Sound, or the Reflexion, be clean and smooth, it maketh them sweeter. Tryal may be made of a Lute or Viol, with the Belly of polished Brass instead of Wood. We fee, that even in the open Air, the Wire-string is sweeter than the string of Guts. And we fee, that for Reflexion, Water excelleth; as in Musk near the Water, or in Echo's.

It hath been tried, that a Pipe, a little moistened on the inside, but yet so as there be no drops left, maketh a more solemn sound, than if the Pipe were dry; but yet with a sweet degree of Sibilation or Purling, as we touched it before in the Title of Equality. The cause is, for that all things porous, being superficially wet, and (as it were) between dry and wet, become a little more even and smooth; but the Purling (which must needs proceed of Inequality) I take to be bred between the smoothness of the inward Surface of the Pipe which is wet, and the rest of the Wood of the Pipe, unto which the wet cometh not, but it remaineth dry.

In Frosty weather, Musk within doors foundeth better; which may be, by reason not of the disposition of the Air, but of the Wood or String of the Instrument, which is made more crisp, and to more porous and hollow; and we see, that Old Lutes found better than New, for the same reason: And so do Lute-strings that have been kept long.

Sound is likewise meliorated by the mingling of open Air with bent Air: Therefore tryal may be made of a Lute or Viol with a double Belly, making another Belly with a knot over the string; yet so, as there be room enough for the strings, and room enough to play below that Belly. Tryal may be also made of an Irish Harp, with a concave on both sides, whereas it useth to have it but on one side. The doubt may be, lest it should make too much sounding, whereby one Note would overtake another.

If you sing in the hole of a Drum, it maketh the singing more sweet. And so I conceive it would, if it were a Song in Parts sung into several Drums; and for handsomeness and strangeness sake, it would not be amiss to have a Curtain between the place where the Drums are, and the hearers.

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

Sound are meliorated by the Intention of the Sense, where the common Sense is collected most to the particular Sense of Hearing, and the Sight suspendeth: And therefore 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 between sleeping and waking, (when all the Senses are bound and suspend) Music is far sweeter than when one is fully waking.

It is a thing strange in Nature, when it is attentively considered, How Children and some Birds learn to imitate Speech. They take no mark at all of the Motion of the Mouth of him that speakest, for Birds are as well taught in the dark, as by light. The Sounds of Speech are very curious and exquisite; so one would think it were a Lelion hard to learn. It is true, that it is done with time, and by little and little, and with many effays and provers: But all this dischargeth not the wonder. It would make a Man think (though this, which we shall say, may seem exceeding strange) that there is some transmission of Spirits, and that the Spirit of the Teacher put in motion, should work with the Spirits of the Learner, a predisposition to offer to imitate, and so to perfect the imitation by degrees. But touching Operations by Transmission of Spirits (which is one of the highest secrets in Nature) we shall speak in due place, chiefly when we come to inquire of Imagination. But as for Imitation, it is certain, That there is in Men, and other Creatures, a predisposition to imitate. We see how ready Apes and Monkeys are to imitate all motions of Man: And in the catching of Dottrelts, we see how the foolish Bird playeth the Ape in gestures: And no Man (in effect) doth accompany with others, but he learneth (etc he is aware) some Gesture, or Voice, or Fashion of the other.

In Imitation of Sounds, that Man should be the Teacher, is no part of the matter: For Birds will learn one of another, and there is no reward by feeding, or the like, given them for the imitation: And besides, you shall have Parrots that will not only imitate Voices, but Laughing, Knocking, Squeaking of a Door upon the Hinges, of a Cart-wheel, and (in effect) any other noise they hear.

No Beast can imitate the Speech of Man, but Birds only: For the Ape it fel, that is so ready to imitate otherwise, attaineth not any degree of imitation of Speech. It is true, that I have known a Dog, that if one howled in his ear, he would fall a howling again while. What should be the aptness of Birds, in comparison of Beasts, to imitate the Speech of Man, may be further inquired. We see that Beasts have those parts, which they count the Instruments of Speech, (as Lips, Teeth, &c.) liker unto Man than Birds. As for the Neck, by which the Throat passeth, we see many Beasts have it for the length, as much as Birds. What better gorge or attire Birds have, may be further inquired. The Birds that are known to be speakers, are Parrots, Pigs, Jays, Daws, and Ravens: Of which, Parrots have an adnuck Bill, but the rest not.

But I conceive, that the aptness of Birds is not so much in the conformity of the Organs of Speech, as in their Attention. For Speech must come by Hearing and Learning: and Birds give more heed, and mark Sounds more
more than Beasts; because naturally they are more delighted with them, and practisethem more, as appeareth in their Singing. We see also, that those that teach Birds to sing, do keep them waking, to increase their attention. We see also, that Cock-Birds, amongst Singing-Birds, are ever the better singers, which may be, because they are more lively, and listen more.

Labor and Intention to imitate Voices, doth conducemuch to imitation: And therefore we see, that there do certain Pantomimis, that will represent the Voices of Players of Interludes, so to life, as if you see them not, you would think they were those Players themselves, and of the Voices of other men that they hear.

There have been somethat could counterfeit the distance of Voices, (which is a secondary object of Hearing) in such sort; as when they stand fast by you, you would think the Speech came from afar off, in a fearful manner. How this is done, may be further enquired; but I see no great use of it, but for Imposture, in counterfeiting ghosts or spirits.

There be three kinds of Reflexions of Sounds; a Reflexion Concurrent, a Reflexion Iterant, which we call Echo, and a Super-reflexion, or an Echo of an Echo, whereof the first hath been handled in the Title of Magnitude of Sounds. The latter two we will now speak of.

The Reflexion of Species Visible by Mirrors, you may command, because passing it 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 therefore, we see there hath not been practisethan any means to make Artificial Ecchos'. And no Echo already known, returneth in a very narrow room.

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

It is certain (as hath been formerly touched,) that if you speak thorow a Trunk, slopped at the further end, you shall finde a blast return upon your mouth, but no sound at all. The cauise is, for that the clofenes, which preserve the original, is notable to preserve the reflected sound; besides that, Eccho's are seldom created, but by loud Sounds. And therefore there is less hope of Artificial Eccho's in Air, pentin a narrow concave. Nevertheless it hath been tryed, that one leaning over a Well of Twenty five fathom deep, and speaking, though but softly, (yet not so soft as a whisper) the Water returned a good audible Echo. It would be tryed, whether speaking in Caves, where there is no issue, save where you speak, will not yield Echo's as Wells do.

The Eccho cometh as the Original Sound doth in a round orb of Air: It were good to try the creating of the Eccho, where the Body repercussing maketh an Angle: As against the Return of a Wall, &c. Alio we see that in Mirrors, there is the like Angle of Incidence, from the Object to the Glass, and from the Glass to the Eye. And if you strike a Ball side-long, not full upon the Surface, the rebound will be as much the contrary way; whether
ther there be any such resilience in Echo’s (that is) Whether a Man shall hear better, if he stand aside the Body reperefuling, than if he stand where he speaketh, or any where in a right Line between) may be tried; Try’l likewise would be made, by standing nearer the place of reperefuling, than he that speaketh; and again, by standing further off, than he that speaketh, and knowledge would be taken, whether Echo’s, as well as Original Sounds, be not stronger near hand.

There be many places, where you shall hear a number of Echo’s one after another; and it is, when there is variety of Hills or Woods, some nearer, some further off: So that the return from the further, being last created, will be likewise last heard.

As the Voice goeth round, as well towards the back, as towards the front of him that speaketh; folikewise doth the Echo, for you have many Brick-echo’s to the place where you stand.

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

From Echo’s upon Echo’s, there is a rare instance thereof in a place, which I will now exactly describe. It is some Three or four Miles from Paris, near a Town called Pont-Carenion; and some Bird-bolt shot or more from the River of Seine. The Room is a Chappel, or small Church; the Walls all standing, both at the sides, and at the ends; two rows of Pillars after the manner of Isles of Churches, also standing; the Roof all open, not so much as any Embowment near any of the Walls left. There was against every Pillar, a stack of Billets above a Mans height, which the Watermen, that bring Wood down the Seine, in Stacks, and not in Boats, laid there (as it seemeth) for their cafe. Speaking at the one end, I did hear it return the Voice Thirteen several times; and I have heard of others, that it would return Sixteen times; for I was there about three of the Clock in the Afternoon; and it is best, (as all other Echo’s are) in the Evening. It is manifest, that it is not Echo’s from several places, but a rolling of the Voice, as a Ball roo and fro; like to Reflexions in Looking-Glasses; where if you place one Glass before, and another behinde, you shall see the Glass behinde with the Image, within the Glass before; and again, the Glass before in that; And divers such Super-Reflexions, till the Species species at last die: For it is every return weaker, and more shady. In like manner, the Voice in that Chappel, createth Species species, and maketh succeeding Super-Reflexions; for it melteth by degrees, and every Reflexion is weaker than the former: So that, if you speak three words, it will (perhaps) some three times report you the whole three words; and then the two latter words for sometimes, and then the last word alone for sometimes, it’ll fading and growing weaker. And whereas in Echo’s of one return, it is much to hear Four or five words. In this Echo of so many Returns, upon the matter, you hear above Twenty words for three.

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The like Echo upon Echo, but only with two reports, hath been observed to be, if you stand between a House and a Hill, and lure towards the Hill; for the House will give a Back Echo; One taking it from the other, and the latter the weaker.

There are certain Letters, that an Echo will hardly express: As S for one, especially being principal in a word. I remember well, that when I went to the Echo at Pont-Carenon, there was an old Parisian that took it to be the Work of Spirits, and of good Spirits. For (said he) call Satan, and the Echo will not deliver back the Devils name: But will say, Va'en, which is as much in French, as Ape, or Avoid. And thereby I did hap to finde, that an Echo would not return S, being but a Hissing and an Interior Sound.

Echo's are some more sudden, and chop again as soon as the Voice is delivered, as hath been partly said; others are more deliberate, that is, give more space between the Voice and the Echo, which is caused by the Local nearness or distance: Some will report a longer train of words, and some a shorter: Some more loud (full as loud as the Original, and sometimes more loud) and some weaker and fainter.

Where Echo's come from several parts, at the same distance they must needs make (as it were) a Quire of Echo's, and so make the Report greater, and even a continued Echo; which you shall finde in some Hills that stand encompassed, Theatre-like.

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

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

Consent of Visibles and Audibles.

Both of them spread themselves in Round, and fill a whole Flore or Orb unto certain Limits; and are carried a great way, and do languish and lessen by degrees, according to the Distance of the Objects from the Specifories.

Both of them have the whole Species in every small portion of the Air or Medium, so as the Species do pass through small Cranes, without confusion: As we see ordinarily in Levels, as to the Eye; and in Cranes, or Chinks, as to the Sound.

Both of them are of a sudden and easie Generation and Delation, and likewise perish swiftly and suddenly; as if you remove the Light, or touch the Bodies that give the Sound.
Both of them do receive and carry exquisite, and accurate differences: as of Colours, Figures, Motions, Distances, in Visibles; and of Articulate Voices, Tones, Songs, and Quaverings, in Audibles.

Both of them in their Vertece and Working, do not appear to emit any Corporal Substance into their mediums, or the Orb of their Vertece; neither again to rise or stir any evident Local Motion in their Mediums as they pass, but only to carry certain Spiritual Species. The perfect knowledge of the cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

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

But both of them in their own proper action, do work three manifest effects. The first, in that the stronger pieces drowneth the lesser: As the light of the Sun, the light of a Glowworm, the report of an Ordnance, the Voice. The second, in that an Object of surcharge or excess, destroyeth the Sense: As the light of the Sun the eye, a violent sound (near the Ear) the Hearing. The third, in that both of them will be reverberate: As in Mirrors, and in Echoes.

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 found, nor 

Both of them affect the Sense in Living Creatures, and yield Objects of Pleasure and Dislike; yet nevertheless, the Objects of them do also (if it be well observed) affect and work upon dead things; namely such, as have some conformity with the Organs of the two Species: As Visibles work upon a Looking-glass, which is like the Pupil of the Eye; and Audibles upon the places of Echo, which resemble, in some sort, the cavity and structure of the Ear.

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

To both, the Medium, which is the most propitious and conducive, is Air; For Glass or Water, &c. are not comparable.

In both of them, where the object is fine and accurate, it conduceth much to have the Sense intensive, and erect; insomuch, as you contract your eye, when you would see sharply, and erect your ear, when you would hear attentively; which in Beasts that have ears moveable, is most manifest.

The Beams of Light, when they are multiplied and conglomerate, generate heat; which is a different action, from the action of Sight: And the Multiplication and Conglomeration of Sounds, doth generate an extreme Rarefaction of the Air; which is an action materiate, differing from the action of Sound. If it be true (which is anciently reported) that Birds, with great houres, have falln down.
Dissent of Visibles and Audibles.

The species of visibles, seem to be emissions of beams from the object seen, almost like odors, save that they are more incorporeal; but the species of audibles, seem to participate more with local motion, like perceptions or impressions made upon the air. So that whereas all bodies do seem to work in two manners, either by the communication of their natures, or by the impressions and signatures of their motions. The diffusion of species visible, seemeth to participate more of the former operation, and the species audible of the latter.

The species of audibles seem to be carried more manifestly to the air, than the species of visibles: for (I conceive) that a contrary strong wind will not much hinder the flight of visibles, as it will do the hearing of sounds.

There is one difference above all others, between visibles and audibles; that is the most remarkable; as that whereupon many smaller differences do depend; namely, that visibles (except lights) are carried in right lines, and audibles in arcurate lines. Hence it cometh to pass, that visibles do not intermingle and confound one another, as hath been said before, but sounds do. Hence it cometh, that the solidity of bodies doth not much hinder the flight, so that the bodies be clear, and the pores in a right line, as in glass, crystal, diamonds, water, &c. But a thin scarf or handkerchief, though they be bodies nothing so solid, hinder the flight: whereas (contrariwise) these porous bodies do not much hinder the hearing; but solid bodies do almost stop it, or at least attenuate it: Hence also it cometh, that to the reflection of visibles, small glasses suffice, but to the reverberation of audibles, are required greater spaces, as hath likewise been said before.

Visibles are seen further off, than sounds are heard; allowing nevertheless the rate of their bigness: For otherwise, a great sound will be heard further off, than a small body seen.

Visibles require (generally) some distance between the object, and the eye to be better seen; whereas in audibles, the nearer the approach of the sound is to the sense, the better; but in this, there may be a double error. The one, because to seeing there is required light, and any thing that toucheth the pupil of the eye (all over) exclude the light. For I have heard of a person very credible, (who himself was cured of a cataract in one of his eyes) that while the silver needle did work upon the sight of his eye, to remove the film of the cataract, he never saw any thing more clear or perfect, than that white needle: which (no doubt) was because the needle was nearer than the pupil of the eye, and took not the light from it. The other error may be, that the object of sight doth strike upon the pupil of the eye, directly without any interception; whereas the cave of the ear doth hold off the sound a little from the organ: and so notwithstanding there is some distance required in both.

Visibles are twifter carried to the sense, than audibles: as appeareth in thunder and lightning, flame, and report of a piece; motion of the air, in hewing of wood. All which have been set down heretofore, but are proper for this title.
Century III.

I conceive also, that the Species of Audibles, do hang longer in the Air than those of Vibles: For although even those of Vibles do hang some time, as we see in Rings turned, that show like spheres. In Lute-stringed, a Fire-brand carried a long, which leaveth a train of light behind it, and in the Twil

ight, and the like: Yet I conceive that Sounds, stay longer because they are carried up and down with the Wind, and because of the distance of the time in Ordnance discharged, and heard twenty miles off.

In Vibles there are not found Objects soodious and ingrate to the Sense, as in Audibles. For soul Sights do rather displea

in, that they excite the memory of foul things, than in the immediate Objects. And therefore in Pictures, those soul Sights do not much offend; but in Audibles, the grating of a Saw when it is sharpened, doth offend too much, as it setteth the Teeth on edge; and any of the harsh Discords in Musick, the Ear doth straightways refute.

In Vibles, after great light, if you come suddenly into the dark, or contrarywise out of the dark into a glaring Light. The eye is dazzled for a time, and the Sight confused; but whether any such effect be after great Sounds, or after a deeper silence may be better enquired. It is an Old Tradition, that those that dwell near the Cataracts of Niims, are strucken deaf: But we finde no such effect in Cannoniers, nor Millers, nor those that dwell upon Bridges.

It seemeth, that the Impress of Colour is so weak, as it worketh not, but by a Cone of direct Beams, or right Lines, whereof the Basis is in the Object and the Vertical point in the Eye: So as there is a corordination and conjunction of Beams; and those Beams so sent forth, yet are not of any force to beget the like borrowed or second Beams, except it be by Reflection, whereof we speak not. For the Beams pass and give little tincture to that Air which is adjacent; which if they did, we should see Colours out of a right line. But as this in Colours, so otherwise it is in the Body of Light. For when there is a skreen between the Candle and the Eye, yet the light paffeth to the Paper whereon one writeth, for that the light is seen where the body of the flame is not seen; and where any Colour (if it were placed where the body of the flame is) would not be seen. I judge that Sound is of this latter nature: For when two are placed on both sides of a Wall, and the voice is heard, I judge it is not only the original sound, which paffeth in an Arcbed line; but the found, which paffeth above the Wall in a Right line, begeteth the like Motion round about it, as the first did, though more weak.

All Concordors and Discords of Musick (no doubt) Sympathies and Antipathies of Sounds, and (lo (likewise) in that Musick, which we call Broken Strum, or Consert Musick; some Conforts of Instrumens are sweeter than others, (a thing not sufficiently yet observed) as the Irish-Harp and Base-Viad agree well; the Recorder and Stringed Musick agree well; Organs and the Voice agree well, &c. But the Virginals and the Lute, or the Welsh-Harp and Irish-Harp, or the Voice and Pipes alone, agree not so well; but for the Melioration of Musick, there is yet much left (in this Point of Exquisite Conforts) to try and enquire.

There is a common observation, That if a Lute or Viol be laid upon the back with a small straw upon one side of the strings, and another Lute or Viol be laid by it; and in the other Lute or Viol the Person to that string be strucken, it will make the string move; which will appear both to the Eye, and by the straws falling off. The like will be if the Diapason or Eight to that string be strucken, either in the same Lute or Viol, or in others lying by: But in none of these there is any report of Sound that can be discerned, but only Motion.
Natural History;

280. It was devised, That a Vial should have a Lay of Wire-strings below, as close to the Belly as a Lute, and then the Strings of Gurs mounted upon a Bridge, as in ordinary Vials; to the end, that by this means, the upper Strings stricken, should make the lower resound by Sympathy, and so make the Musick the better; which, if it be to purpose, than Sympathy worketh as well by report of Sound, as by Motion. But this device, I conceive, to be of no use, because the upper Strings which are flopped in great variety, cannot maintain a Dissonance or a Unison, with the lower, which are never flopped. But if it should be of use at all, it must be an Instrument which have no flops, as Virginals and Harps; wherein trial may be made of two rows of Strings, distant the one from the other.

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

282. It feemeth both in Ear and Eye, the Instrument of Sense hath a Sympathy or Similitude with that which giveth the Reflexion (is hath been touched before.) For as the sight of the Eye is like a Chrysal, or Glass, or Water; so is the Ear a finous Cave with a hard Bone, to stop and reverberate the Sound! Which is like to the places that report Echo's.

283. When a Man yawneth, he cannot hear so well. The cause is, for that the Membrane of the Ear is extended, and so rather callith off the Sound, than draweth it to.

284. We hear better when we hold our Breath, than contrary, inasmuch, as in all listening to attain a Sound a far off, Men hold their Breath. The cause is, for that in all Expiration, the motion is outwards, and therefore rather driveth away the voice than draweth it: And besides, we fee that in all labor to do things with any strength, we hold the Breath; and listening after any Sound that is heard with difficulty, is a kinde of labor.

285. Let it be tried, for the help of the Hearing, (and I conceive it likely to succeed) to make an Instrument like a Tunnel: the narrow parte whereof may be of the bigness of the hold of the Ear; and the broader end much larger; like a Bell at the skirts, and the length half a foot or more. And let the narrow end of it be let close to the Ear. And mark whither any Sound abroad in the open Air, will not be heard distinctly, from further distance; than without that Instrument; being (as it were) an Ear fielde. And I have heard there is in Spain, an Instrument in use to be let to the Ear, that helpeth somewhat to that which are Thickest of Hearing.

286. If the Mouth be flut close, nevertheless there is yielded by the Roof of the Mouth, a Murmur; such as is used by Dumb men: But if the Nostrils be likewise flopped, no such Murmur can be made, except it be in the bottom of the Palate towards the Throat. Whereby it appeareth manifestly, that a Sound in the Mouth, except such as aforesaid, if the Mouth be stopped, paseth from the Palate through the Nostrils.

287. The Repercussion of Sounds, (which we call Echo) is a great Argument of the Spiritual Essence of Sounds. For if it were Corporeal, the Recuperating should be created in the same manner, and by like Instruments, with the
the original Sound: But we see what a number of exquisite Instruments must concur in speaking of words, whereas there is no such matter in the returning of them, but only a plain stop, and repercussion.

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

All Sounds are suddenly made, and do suddenly perish; but neither that, nor the exquisite Differences of them, is matter of so great admiration: For the Quiverings, and Warblings of Lutes, and Pipes are as swift; and the Tongue (which is no very fine Instrument) doth in speech, make no fewer motions, than there be letters in all the words which are uttered. But that Sounds should not only be so speedily generated, but carried so far every way, in such a momentary time; deserveth more admiration. As for example, If a man stand in the middle of a Field, and speak aloud, he shall be heard a Furlong in round, and that shall be in articulate Sounds, and those shall be entire in very little portion of the Air; and this shall be done in the space of less than a minute.

The sudden Generation and Perishing of Sounds, must be one of these two ways: Either, that the Air suffereth some force by Sound, and then restoreth it as Water doth; which being divided, maketh many circles, till it restoreth itself to the Natural constance; or otherwise, that the Air doth willingly imbibe the Sound as grateful, but cannot maintain it; for that the Air hath (as it should seem) a secret and hidden Appetite of receiving the Sound at the first; but then other gross and more materiale qualities of the Air straight ways suffocates it, like unto Flame which is generated with alacrity, but straight quenched by the enmity of the Air, or other Ambient Bodies.

There be these differences (in general) by which Sounds are divided:

2. Treble, Base.
3. Flat, Sharp.
4. Soft, Loud.
5. Exterior, Interior.
6. Clean, Harsh, or Purling.
7. Articulate, Inarticulate.

We have labored (as may appear) in this Inquisition of Sounds diligently; both because Sound is one of the most hidden portions of Nature, (as we said in the beginning) and because it is a Verrue which may be called Incorporal and Immateriale, whereof there be in Nature but few. Besides, we were willing (now in these our first Centuries) to make a pattern of precedent of an Exact Inquisition; and we shall do the like hereafter in some other subjects which require it. For we desire that Men should learn and perceive how severe a thing the true Inquisition of Nature is; and should accustom themselves by the light of particulars, to enlarge their minde to the amplitude of the World; and not to reduce the World to the narrowness of their Minde.
Metallic Bodies give orient and fine Colours in Dissolution; as Gold giveth an excellent Yellow, Quick-silver an excellent Green, Tin giveth an excellent Azure. Likewise in their Putrefactions, or Rufts; as Vermilion, Verdegref, Bile, Cittus, &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 equal posture, and again, to retain part of their principal Spirit: Which two things (equal posture, and quick Spirits) are required chiefly, to make Colours lightfome.

It conduceth unto long Life, and to the more placide Motion of the Spirits, which thereby do less prey and consume the Juyce of the Body: either that Mens actions be free and voluntary, that nothing be done inviol minerva, but secundum genium; or, on the other side, that the Actions of Men be full of Regulation, and commands within themselves: For then the victory and performing of the command, giveth a good disposition to the Spirits, especially if there be a proceeding from degree to degree, for then the sense of victory is the greater. An example of the former of these, is in a Country life; and of the latter, in Monks and Philosophers, and such as do continually enjoy themselves.

It is certain, that in all Bodies, there is an Appetite of Union, and Evituation of Solution of Continuity: And of this Appetite there be many degrees, but the most remarkable, and fit to be distinguished, are three. The first in Liquors, the second in hard Bodies, and the third in Bodies cleaving or tenacious. In Liquors this Appetite is weak; we see in Liquors, the Threading of them in Stipilcides (as hath been said) the falling of them in round drops (which is the form of Union) and the staying of them for a little time in Bubbles and Froth. In the second degree or kind, this Appetite is strong; as in Iron, in Stone, in Wood, &c. In the third, this Appetite is in a Medium between the other two: For such Bodies do partly follow the touch of another Body, and partly stick and continue to themselves; and therefore they rope and draw themselves in threads, as we see in Fitch, Glue, Birdlime, &c. But note, that all solid Bodies are cleaving more or less: and that they love better the touch of somewhat that is tangible, than of Air. For Water in small quantity cleaveth to any thing that is solid, and so would Metal too, if the weight drew it not off. And therefore Gold Foliare, or any Metal Foliare, cleaveth: But these Bodies which are noted to be clammy, and cleaving, are such as have a more indifferent Appetite (at once) to follow another Body, and to hold to themselves. And therefore they are commonly Bodies ill mixed, and which take more pleasure in a Foreign Body, that in preserving their own consistence, and which have little predominance in Drought or Moisture.

Time and Heat are fellows in many effects. Heat drieth Bodies that do easily expire; as Parchment, Leaves, Roots, Clay, &c. And so doth Time or Age alterie; as in the same Bodies, &c. Heat dissolveth and melteth Bodies that keep in their Spirits, as in divers Liquefactions; and so doth Time, in some Bodies of a softer consistence: As is manifest in Honey, which by Age waxeth more liquid, and the like in Sugar; and so in old Oyl, which is ever more clear and more hot in medicinal use. Heat causeth the Spirits to search some issue out of the Body, as in the Sputility.
Some things which pass the Fire, are softest at first, and by Time grow hard, as the Crumb of Bread. Some are harder when they come from the Fire, and afterwards give again, and grow soft as the Crumb of Bread, Bisket, Sweet-Meaty, especially, Fire, and whatever the Fire baketh, Time doth in some degree dissolve.

Otions pass from one Man to another, not so much by exciting Imagination as by Invitation, especially if there be an Aptness or Inclination before. Therefore Gaping, or Yawning, and Stretching, do pass from Man to Man; for that which causeth Gaping or Stretching is, when the Spirits are a little Heavy, by any Vapor, or the like. For then they strive (as it were) to wring out, and expel that which loadeth them. So Men drowsy and desirous to sleep; or before the fit of an Ague, do use to yawn and stretch, and do likewise yield a Voice or Sound, which is an Interjection of Expulsion: So that if another be apt and prepared to do the like, he followeth by the fight of another. So the Laughing of another maketh to laugh.

Here be some known Diseases that are Infectious, and others that are not. Those that are infectious, are first, Such as are chiefly in the Spirits, and not so much in the Humors, and therefore pass easily from Body to Body; such are Pettablenes Lippitudes, and such like. Secondly, such as taint the breath, which we see passeth manifestly from Man to Man, and not invisible as the effects of the Spirits do; such are Consumptions of the Lungs, &c. Thirdly, Such as come forth to the skin, and therefore taint the Air, or the Body adjacent; especially, if they consist in an unctuous fulbance, not apt to disspire; such are Scabs, and Leprosie. Fourthly, such as are merely in the Humors, and not in the Spirits, Breath, or Exhalations: And therefore they never infect, but by touch only; and such a touch also, as cometh within the Epidermus, as the venome of the French Pox, and the biting of a Mad Dog.

Oft Powders grow more close and coherent by mixture of Water, than by mixture of Oyl, though Oyl be the thicker Body; as Meat, &c. The reason is the Congruity of Bodies, which if it be more, maketh a perfect imbibition, and incorporation; which in most Powders is more between them and Water, than between them and Oyl: But Painters colours ground, and ashes, do better incorporate with Oyl.

Much Motion and Exercife is good for some Bodies, and sitive and leis motion, for others. If the Body be hot, and void of superfluous Moistures, too much Motion hurreth; and it is an error in Physicians, to call too much upon Exercife. Likewise, Men ought to beware, that they use not Exercife, and a spare diet, both; but if much Exercife, then a plentiful diet; and if sparing diet, then little Exercife. The Benefits that come of Exercife are. First, that it tendeth nourishment into the parts more forcibly.
Secondly, that it helpeth to excarn by Sweat, and so maketh the parts to assimilate the more perfectly. Thirdly, that it maketh the substance of the Body more solid and compact; and so les apt to be consumed and depredated by the Spirits. The Exils that come of Exercise, are, First, That it maketh the Spirits more hot and predatory. Secondly, That it doth absorb like wise, and attenuate too much the moisture of the Body. Thirdly, That it maketh too great Concussion, (especially, if it be violent) of the inward parts, which delight more in rest. But generally Exercise, if it be much, is no friend to prolongation of life; which is one cause, Why Women live longer then Men, because they stir less.

Some Food we may use long, and much, without glutting; as Bread, Flesh that is not Fat, or Rank, &c. Some other (though pleasant) gluteth sooner, as Sweet-Meats, Fat-Meats, &c. The cause is, for that Appetite confilith in the emptiness of the Mouth, of the Stomach, or possessith it with somewhat that is astringent; and therefore, cold and dry: But things that are sweet and fat, are more filling, and do swim and hang more about the Mouth of the Stomach, and go not down so speedily; and again turn sooner to Choler, which is hot, and ever abateth the appetite. We see also, that another cause of Satiety, is an Over-cuslom; and of Appetite, is novelty. And therefore Meats, if the same be continually taken, induce Loathing. To give the reason of the distaste of Satiety, and of the pleasure in novelty, and to distinguish not onely in Meats and Drinks, but also in Motions, Loves, Company, Delight, Studies, what they be that Custom maketh more grateful; and whatmore tedious, were a large Field. But for Meats, the cause is Attraction, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a relish by former use. And (generally) it is a rule, That whatsoever is somewhat ingratitude at first, is made grateful by Custom; but whatsoever is too pleasing at first, groweth quickly to Satiety.
Aceleration of Time, in Works of Nature, may well be esteemed Inter Magnalia Natura. And even in Divine Miracles Accelerating of the Time, is next to the Creating of the Matter. We will now therefore proceed to the enquiry of it; and for Acceleration of Germination, we will refer it over unto the place, where we shall handle the Subject of Plants, generally; and will now begin with other Accelerations.

Liquors are (many of them) at the first, thick and troubled; As Must, Worts, Jusce of Fruits, or Herbs expressed. &c. And by Time, they settle and clarifie. But to make them clear, before the Time, is a great work; for it is a Spur to Nature, and putteth her out of her pace: And besides, it is of good use for making Drinks, and Sauces, Potable, and Serviceable, speedily. But to know the Means of Accelerating Clarification, we must first know the causes of Clarification. The first cause is, by the Separation of the grosser parts of the Liquor, from the finer. The second, by the equal distribution of the Spirits of the Liquor, with the tangible parts; for that ever prevalent Bodies clear and untroubled. The third, by the refining the Spirit it self, which thereby giveth to the Liquor more Splendor, and more lustr.

First, For Separation: It is wrought by weight; as in the ordinary residence or settlement of Liquors. By Heat, by Motion, by Precipitation, or Sublimation, (that is, a calling of the several parts, either up or down, which is a kind of Attraction,) by Adhesion; as when a Body, more viscous, is mingled and agitated with the Liquor; which viscous Body (afterwards se-
Natural History:

303. A (tor) and Tor emptying put for and yet 305. 303.

304. Secondly, For the even Distribution of the Spirits, it is wrought by gentle heat, and by Agitation of Motion; (for of Time we speak not, because it is that we would anticipate and represent:) And it is wrought also, by mixture of some other Body, which hath a virtue to open the Liquor, and to make the Spirits the better pass thorough.

305. Thirdly, For the refining of the Spirit, it is wrought likewise by Hear, by motion, and by mixture of some Body which hath virtue to attenuate. So therefore (having shewed the causes) for the accelerating of Clarification in general, and the enduring of it, take these Instances and Tryals.

306. It is in common practice, to draw Wine or Beer, from the Lees, (which we call Racking) whereby it will clarify much the sooner: For the Lees, though they keep the drink in heart, and make it lasting; yet withal they cast up some spittitude: and this Instance is to be referred to Separation.

On the other side, it were good to try, what, the adding to the Liquor, more Lees than his own, will work; for though the Lees do make the Liquor turbide, yet they refine the Spirits. Take therefore a Vessel of new Beer, and take another Vessel of new Beer, and rack the one Vessel from the Lees, and pour the Lees of the racked Vessel into the uncracked Vessel, and see the effect.

This Instance is referred to the Refining of the Spirits.

307. Take new Beer, and put in some quantity of stale Beer into it, and see whether it will not accelerate the Clarification, by opening the Body of the Beer, and cutting the groller parts, whereby they may fall down into Lees. And this Instance again is referred to Separation.

308. The longer Molts or Harbs, or the like, are infused in Liquor, the more thick and troubled the Liquor is; but the longer they be decocted in the Liquor, the clearer it is. Thereon is plain, because in Infuion, the longer it is, the greater is the part of the gross Body that goeth into the Liquor: But in Decoction, though more goeth forth, yet it either purgeth at the top, or settleth at the bottom. And therefore the most exact way to clarify is, first, to Infuse, and then to take off the Liquor and decoct it; as they do in Beer, which hath Molt first infused in the Liquor, and is afterwards boiled with the Hop. This also is referred to Separation.

309. Take hot Embers, and put them about a Bottle filled with new Beer, almost to the very neck; let the Bottle be well stopped, left it file out: And continue it, renewing the Embers every day by the space of ten days, and then compare it with another Bottle of the same Beer let by. Take also Lime, both quenched and unquenched, and let the Bottles in them mfupra. This Instance is referred, both to the even Distribution, and also to the Refining of the Spirit by Hear.

310. Take Bottles and swing them; or carry them in a Wheel-Barrow upon rough Ground, twice in a day: But then you may not fill the Bottles full, but leave some Air; for if the Liquor come close to the Bopple, it cannot play nor flower: And when you have shaken them well either way, pour the Drink in another Bottle, stopped close after the usual manner; for if it play with much Air in it, the Drink will pall, neither will it settle so perfectly in all the parts. Let it stand some Twenty four hours, then take it, and put it again into a Bottle with Air, mfupra; and thence into a Bottle stopped, mfupra; and for repeat the same operation for seven days. Note, that in the emptying of one Bottle into another, you must do it swiftly, lest the Drink pall,
pall. It were good alio to try it in a Bottle with a little air below the Neck without emptying. This Instants is referred to the even Distribution and Refining of the Spirits by Motion.

As for Percolation, inward, and outward (which belongeth to Separation,) Tryal would be made of Clarifying by Adhesion, with Milk put into new Beer, and stirred with it: For it may be, that the groffer part of the Beer will cleave to the Milk; the doubt is, whether the Milk will sever well again, which is soone tried. And it is usual in clarifying *ippocrafs* to put in Milk, which after severeth and carries with it the groffer parts of the *ippocras*, as hath been said elsewhere. Alfo for the better Clarification by Percolation; when they Tunk new Beer, they use to let it pass through a Strainer, and it is like the finer the Strainer is, the clearer it will be.

The Accelerating of Maturation, we will now enquire of, and of Maturation it felf. It is of three natures, the Maturation of Fruits, the Maturation of Drinks, and the Maturation of Impoftumes and Vees. This last we refer to another place, where we shall handle Experiments Medicinal. There be alfo other Matuations, as of Metals, &c. whereof we speak as occasion serveth. But we will begin with that of Drinks, because it hath such affinity with the Clarification of Liquors.

For the Maturation of Drinks, it is wrought by the Congregation of the Spirits together, whereby they digest more perfectly the groffer parts; and it is effect'd, partly by the fame means that Clarification is (whereof we spake before:) But then note, that an extrem Clarification doth speed the Spirits so smooth, as they become dull, and the drink dead, which ought to have a little flowing. And therefore all your clear *Ambardrake* is flat.

We see the degrees of Maturation of Drinks, in Must, in Wine, as it is drunk, and in Vinegar. Whereof Must hath not the Spirits well congregated, Wine hath them well united, fo as they make the parts somewhat more Oyl, Vinegar hath them congregated, but more Jejune, and in smaller quantity; the greatest and fift Spirit and part being exhaled: For we see Vinegar is made by letting the Vefiel of Wine against the hot Sun. And therefore Vinegar will not burn, for that much of the finer part is exhaled.

The refreshing and quickening of Drink pall'd or dead, is by enforcing the motion of the Spirit. So we see that open weather relaxeth the Spirit, and maketh it more lively in Motion. We see alfo Bottelling of Beer or Ale, while it is new and full of Spirit, (so that it spireth when the Stopple is taken forth) maketh the Drink more quick and windy. A Pan of Coals in the Cellar, doth likewise good, and maketh the Drink work again. New Drink put to Drink that is dead, provoketh it to work again: Nay, which is more (as some affirm) a Brewing of new Beer, set by old Beer, maketh it work again: It were good alio to enforce the Spirits by some mixtures, that may excite and quicken them, as by the putting into the Bottles, Nitre Chalk, Lime, &c. We see Cream is matured, and made to rise more quickly by putting in cold Water; which, as it coagmeth, setteth down the Whey.

It is tryd, that the burying of Bottles of Drink well stopp'd, either in dry Earth, a good depth, or in the bottom of a Well within Water; and beft
of all, the hanging of them in a deep Well somewhat above the Water, for some fortnights space, is an excellent means of making Drink fresh and quick: For the cold doth not cause any exhaling of the Spirits at all, as heat doth, though it rarifie the rest that remain: But cold maketh the Spirits vigorous, and irritate them, whereby they incorporate the parts of the Liquor perfectly.

As for the Maturacion 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 Maturacion.

There were taken Apples, and laid in Straw, in Hay, in Flower, in Chalk, in Lime, covered over with Onions, covered over with Crabs, closed up in Wax, shut in a Box, &c. There was also an Apple hanged up in smoak. Of all which the Experiment sortet in this manner.

After a moneths space, the Apple, enclosed in Wax, was as Green and fresh as at the first putting in, and the Kernels continued White. The cause is, for that all exclusion of open Air, (which is ever predatory) maintaineth the Body in his first freshness and moisture; but the inconvenience is, that it taketh a little of the Wax, which, I suppose, in a Pomegranate, or some such thick coated fruit, it would not do.

The Apple hanged in the smoak, turned like an old Mellow-Apple wrinkled, dry, soft, sweet, yellow within. The cause is, for that such a degree of heat, which doth neither melt nor scorch (for we see that in a greater heat, a roast Apple softeth and melteth, and Pigs feet made of quarters of Wardens, scorch and have a skin of coal) doth Mellow, and not adure: The smoak also maketh the Apple (as it were) sprinkled with Soot, which helpeth to mature. We see, that in drying of Pears and Prunes, in the Oven, and removing of them often as they begin to sweat, there is a like operation: but that is with a far more intense degree of heat.

The Apples covered in the Lime and Ashes, were well matured as appeared both in their yellowness and sweetness. The cause is, for that Degree of Heat, which is in Lime and Ashes, (being a smoothering heat) is of all the rest most proper; for it doth neither Liqueifie nor Arcifie, and that is true Maturation. Note, that the taste of those Apples was good, and therefore it is the Experiment fittest for use.

The Apples covered with Crabs and Onions, were likewise well matured. The cause is not any heat, but for that the Crabs and the Onions draw forth the Spirits of the Apple, and spred them equally thoroughout the Body; which taketh away hardness. So we see one Apple ripeneth against another. And therefore in making of Cider, they turn the Apples first upon a heap; so one Cluster of Grapes, that toucheth another while it groweth, ripeneth faster. Borrus contra Borrum citius maturest.

The Apples in Hay and the Straw, ripened apparently, though not so much as the other, but the Apple in the Straw more. The cause is, for that the Hay and Straw have a very low degree of Heat, but yet close and smoothering, and which derveth not.

The Apple in the close Box was ripened also. The cause is, for that all Air kept close, hath a degree of warmth; as we see in Wool, Fur, Plush, &c.

Note.
Note, That all these were compared with another Apple of the same kind: that lay of it self: and in comparison of that, were more sweet, and more yellow, and as appeared to be more ripe.

Take an Apple, or Pear, or other like Fruit, and roll it upon a Table hard: We see in common experience, that the rolling doth soften and sweeten the Fruit presently, which is nothing but the smooth distribution of the Spirits into the parts; for the unequal distribution of the Spirits maketh the harrifhness: But this hard rolling is between Concoction, and a simple Maturation; therefore, if you should roll them but gently perhaps twice a day, and continue it some twelve days, it is like they would Mature more finely, and like unto the Natural Maturation.

Take an Apple, and cut out a piece of the top and cover it, to see whether that Solution of Continuity will not haften a Maturation. We see that where a Wasp, or a Fly, or a Worm, hath bitten in a Grape or any Fruit, it will sweeten halily.

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

In these Trials also as was used in the first, let another of the same Fruits by, to compare them, and try them by their Yellowness, and by their Sweetness.

The World hath been much abused by the opinion of Making of Gold. The Work it self, I judge to be possible; but the Means (hitherto pronounced) to effect it, are in the Practice, full of Error and Imputation; and in the Theory, full of unsound Imaginations. For to say, that Nature hath an invention to make all Metals Gold; and that, if she were delivered from Impediments, she would perform her own work; and that, if the Crudities, Impurities, and Leprousies of Metals were cured, they would become Gold; and that a little quantity of the Medicine in the Work of Projection, will turn a Sea of the baser Metal into Gold by multiplying, All these are but dreams; and so are many other Grounds of Alchymy. And to help the matter, the Alchymists call in likewise many vanities, out of Astrology, Natural Magick, Superficious Interpretations of Scriptures, Arcana Traditions, Feigned Testimonies of Ancient Authors, and the like. It is true, on the other side: they have brought to light not a few profitable Experiments, and thereby made the World some amends: But we, when we shall come to handle the Verion and Transmutation of Bodies, and the Experiments concerning Metals and Minerals, will lay open the true Ways and Passages of Nature, which may lead to this great effect. And we commend the wit of the Chemists, who despair of making of Gold, but are mad upon the making of Silver. For certain it is, That it is more difficult to make Gold, (which is the most ponderous and material amongst Metals) of other Metals, less ponderous and less malleable, than (by a way) to make Silver of Lead, or Quick-silver; both which are more ponderous than Silver: So that they need rather a further degree of Fixation, than any Condensation. In the mean time, by occasion of handling the Axioms touching Maturation, we will direct a trial touching the Maturation of Metals, and thereby turning some of them into Gold; for we conceive indeed, that a perfect good Condensation, or Digestion, or Maturation of some Metals will produce Gold. And here we call to minde, that we knew a Dutchman that had wrought himself into the belief of a
great person, by undertaking, that he could make Gold: 'Whose discourse was, That Gold might be made, but that the Alchemists over-fired the work: For (he said) the making of Gold did require a very temperate Heat, as being in Nature a subterranean work, where little Heat cometh; but yet more to the making of Gold, than of any other Metal: And therefore, that he would do it with a great Lamp, that should carry a temperate and equal Heat, and that it was the work of many Moneths. The devil of the Lamp was folly, but the overfiring now used, and the equal Heat to be required, and the making it a work of some good time, are no ill discourages.

We resort therefore to our Axioms of Maturation, in effect touched before.

The first is, That there be used a Temperate Heat; for they are ever Temperate Heats that Digsels, and Mature; wherein we mean Temperate, according to the Nature of the Subject: For that may be Temperate to Fruits and Liquors, which will not work at all upon Metals.

The second is, That the Spirit of the Metal be quickned, and the Tangible Parts opened: For without those two operations, the Spirit of the Metal, wrought upon, will not be able to disgeft the Parts.

The third is, That the Spirits do spread themselves even, and move not subsaltorily, for that will make the parts close and pliant. And this requireth a Heat that doth not rise and fall, but continue as equal as may be.

The fourth is, That no part of the Spirit be omitted but detained: For if there be Emiflion of Spirit, the Body of the Metal will be hard and churlish. And this will be performed, partly by the temper of the Fire, and partly by the closeness of the Vefsel.

The fifth is, That there be choice made of the likeliest and best prepared Metal for the Veflion; for that will facilitate the Work.

The sixth is, That you give time enough for the Work, not to prolong hopes (as the Alchemists do), but indeed to give Nature a convenient space to work in.

These principles most certain and true, we will now derive a direction of Tryal out of them, which may (perhaps) by further Meditation be improved.

Let there be a small Furnace made of a Temperate Heat; let the heat be such as may keep the Metal perpetually molten, and no more; for that above all, importeth to the Work: For the Material, take Silver, which is the Metal, that in Nature, symbolizeth most with Gold; put in also, with the Silver a tenth part of Quick-silver, and a twelfth part of Nitre by weight: Both these to quicken and open the Body of the Metal: and solet the Work be continued by the space of Six Moneths, at the least. I wish also, That there be as sometimes an Injection of some Oyled Substances, such as they ufe in the recovering of Gold, which by vcing with Separations hath been made churlish: And this is, to lay the parts more close and smooth, which is the main work. For Gold (as we fee) is the closelleft (and therefore the heaviest) of Metals; and is likewise the most flexible and tenfible. Note, That to think to make Gold of Quick-silver because it is the heaviest, is a thing not to be hoped; for Quick-silver will not endure the mannage of the Fire: Next to Silver, I think Copper were sittest to be the Material.

Gold
Old hath these Natures: Greatness of VWeight, Cloineness of Parts, Fixation, Plianneness or Softness, Immunity from Rust, Colour or Tinture of Yellow. Therefore the true way (though most about) to make Gold, is to know the causes of the several Natures before reheard, and the Axioms concerning the same. For if a Man can make a Metal that hath all these Properties, let Men dispute, whether it be Gold, or no?

The Enducing and Accelerating of Putrefaction, is a subject of a very Universal Enquiry. For Corruption is a Reciprocal to Generation; and they two are as Natures to Terms or Boundaries; and the Guides to Life and Death. Putrefaction is the VWork of the Spirits of Bodies, which ever are unquiet to get forth and congregate with the Air, and to enjoy the Sun-Beams. The getting forth, or spreading of the Spirits, (which is a degree of getting forth) have five differing operations. If the Spirits be detained within the Body, and move more violently, there followeth Colli- quation; as in Metals, &c. If more mildly, there followeth Digestion or Maturation; as in Drinks and Fruits. If the Spirits be not more violently detained, but Provade a little, and that Motion be confused, and inordinate, there followeth Putrefaction; which ever dissolveth the Consistence of the Body into much inequility; as in Flesh, Rotten Fruits, Shining VWood, &c. and also in the Rust of Metals. But if that Motion be in a certain order, there followeth Vvivification and Figureation; as both in Living Creatures bred of Putrefaction, and in Living Creatures perfect. But if the Spirits issue out of the Body, there followeth Defaecation, Induration, Consumption, &c. As in Brick, evaporation of Bodies Liquid, &c.

The Means to enduce and accelerate Putrefaction, are, First, By adding some crude or watry moisture; as in VVetting of any Flesh, Fruit, Wood, with Water, &c. For contrariwise, Undulous and Oyly Substances prefervc.

The second is, By Invitation or Excitation; as when a rotten Apple lieth close to another Apple that is found; or when Dung (which is a substance already purified) is added to other Bodies. And this is also notably seen in Church-yards, where they bury much; where the Earth will consume the Corps, in far shorter time than other Earth will.

The third is, By Cloineness and Stopping, which detaineth the Spirits in Prifon, more then they would, and thereby irritateth them to seek issue; as in Corn and Cloaths which wax mutfy; and therefore open Air (which they call Aer perflabilis) doth preferve: And this doth appear more evident-ly in Agues, which come (most of them) of obstructions and penning the Humors, which therupon Putrific.

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 Fles of Creatures alive, where they have received any wound.

The fifth is, Either by the Exhaling, or by the driving back of the principal Spirits, which preferve the consistence of the Body: so that when their Government is dissolved every part returneth to his Nature, or Homogeny. And this appeareth in Urine and Blood, when they cool and thereby break. It appeareth also in the Gangren or Mortification of Flesh, either by Opiates, or by Interse Colds. I conceive also, the same effect.
is in Pestilences, for that the malignity of the infecting vapor, daunteth the principal Spirits, and maketh them flee, and leave their Regiment; and then the Humors, Flesh, and Secondary Spirits, do dissolve and break, as in an Antechy.

The sixth is, When a Foreign Spirit, stronger and more eager than the Spirit of the Body, entrieth the Body, as in the birthing of Serpents. And this is the cause (generally) that upon all Poisons followeth Swelling; and we see Swelling followeth also, when the Spirits of the Body itself congregate too much; as upon blows and bruises, or when they are pent in too much, as in Swelling upon Cold. And we see also, that the Spirits coming of Putrefaction of Humors in Agues, &c. which may be counted as Foreign Spirits, though they be bred within the Body, do extinguishe and suffocate the Natural Spirits and heat.

The seventh is, By such a weak degree of heat, as feteth the Spirits in a little Motion, but is not able either to digest the parts, or to issue the Spirits, as is seen in Flesh kept in a room that is not cool: whereas in a cool and wet Larder it will keep longer. And we see, that Vivification (whereof Putrefaction is the Bastard Brother) is effected by such soft heats; as the hatching of Eggs, the heat of the Womb, &c.

The eighth is, By the releasing of the Spirits, which before were close kept by the loifiness of their couverture, and thereby their appetite of issuing checked; as in the artificial heats induced by Strong waters in Iron, Lead, &c. And therefore wetting haltneth Rust or Putrefaction of any thing, because it losneth the Fruit, for the Spirits to come forth.

The ninth is, By the enterchange of heat and cold, or wet and dry; as we see in the Moulding of Earth in Frosts, and Sun; and in the more hastily rotting of Wood, that is sometimes wet, sometimes dry.

The tenth is, By time, and the work, and procedure of the Spirits themselves, which cannot keep their station; specially, if they be left to themselves, and there be not Agitation or Local Motion. As we see in Corn not stirred, and Mens Bodies not exercised.

All Moulds are Inceptions of Putrefaction; as the Moulds of Pyes and Flesh the Moulds of Oranges and Lemmons, which Moulds afterward turn into VVorms, or more odious Putrefactions: And therefore (commonly) prove to be of ill odor. And if the Body be liquid, and not apt to putrifie totally, it will call up a Mother in the top, as the Mothers of Distilled waters.

Moss is a Kinde of Mold of the Earth and Trees: But it may be better forled as a Rudiment of Germination, to which we refer it.

It is an Enquiry of excellent use to enquire of the Means of Preventing or Staying of Putrefaction: for therein considerst the Means of Conseruation of Bodies: For Bodies have two kindes of Dissolutions, the one by Consumption and Dissection, the other by Putrefaction. But as for the Putrefactions of the Bodies of Men and Living Creatures (as in Agues, VVorms, Consumptions of the Lungs, Imposthumus, and Ulcers, both inwards and outwards) they are a great part of Physick and Surgery: And therefore we will reserve the Enquiry of them to the proper place, where we shall handle Medicinal Experiments of all sorts. Of the rest, we will now enter into an Enquiry, wherein much light may be taken from that which hath been said of the Means to endue or accelerate Putrefaction; For the removing that which caused Putrefaction, doth prevent and avoid Putrefaction.

The
The first Means of prohibiting or checking Putrefaction is cold; for so we see that Meat and Drink will last longer, unpurified, or untamed, in Winter, than in Summer: And we see that Flowers, and Fruits; put in conservatories of Snow, keep fresh. And this worketh by the Detention of the Spirits, and conflagration of the Tangible parts.

The second is Attrition: For Attrition prohibiteth Dissolution; as we see generally in Medicines, whereto such as are Attritional do inhibit Putrefaction: And by the same reason of Attrition, some small quantity of Oyl of Vitriol, will keep fresh water long from putrifying. And this Attrition is in a substance that hath a virtual cold, and it worketh (partly) by the same means that cold doth.

The third is; The excluding of the Air; and again, the exposing to the Air: For these contraries, (as it cometh often to pass) work the same effect, according to the nature of the Subject-matter. So we see, that Beer or Wine in Bottles close stopp'd, last long; that the Garners under Ground keep Corn longer, than those above Ground; and that Fruit closed in Wax, keepeth fresh: And likewise, Bodies put in Honey, and Flower, keep more fresh: And Liquors, Drinks, and Juices, with a little Oyl cast on the top, keep fresh. Contrariwise, we see that Cloath and Apparel, not aired, do breed Moths and Moulds; and the Diversities, that in Bodies that need Detention of Spirits, the Exclusion of the Air doth good; as in Drinks, and Corn: But in Bodies that need Emision of Spirits, to discharge some of the superfluous moisture, it doth hurt, for they require airing.

The fourth is Motion, and Stirring; for Putrefaction asketh Rest: For the subtil Motion which Putrefaction requireth, is disturbed by any Agitation, and all Local Motion keepeth Bodies integral, and their parts together: As we see, that turning over of Corn in a Gardner, or letting it run like an Hour-Glass, from an upper Room into a lower, doth keep it sweeter; And running Waters purifie not; and in Mens Bodies, exercise hindereth Putrefaction; and contrarywise Rest, and want of Motion or stoppings (whereby the running of Humors, or the Motion of Perspiration, is stayed) further Putrefaction; as we partly touched a little before.

The fifth is, The Breathing forth of the Adventitious Moisture in Bodies, for as wetting doth halten Putrefaction; to convenient drying (whereby the more Radical Moisture is only kept in) putrefie back Putrefaction: So we see that Herbs and Flowers, if they be dried in the shade, or dried in the hot Sun, for a small time keep better. For the Emision of the loose and adventitious Moisture, doth betray the Radical Moisture, and carryeth it out for company.

The sixth is, The strengthening of the Spirits of Bodies; for as a great heat keepeth Bodies from Putrefaction; but a tepid heat enclincheth them to Putrefaction: So a strong Spirit likewise preserveth, and a weak or faint Spirit doth opposeth to corruption. So we finde, that Salt-water corrupteth not to soon as fresh, and falling of Oysters, and powdering of Meat, keepeth them from Putrefaction. It would be tried also, whether Chalk, put into Water, or Drink, doth not preserve it from Putrifying, or speedy souring. So we see that Strong-Beer will last longer than small, and all things, that are hot and aromatical, do help to preserve Liquors, or Powders, &c. which they do, as well by strengthening the Spirits, as by soaking out the loose Moisture.
The seventh is, Separation of the cruder parts, and thereby making the Body more equal; for all unperfect mixture is apt to putrifie, and Watry substances are more apt to putrifie, than oily. So, we see distilled Waters will last longer than raw Waters, and things that have passed the Fire, do last longer than those that have not passed the Fire; as dried Pears, &c.

The eighth is, The drawing forth continually of that part, where the Putre-faction beginneth: Which is (commonly) the loofe and watry moisture; not only for the reason before given, that it provoketh the radical moisture to come forth with it; but because being detained in the Body, the Putrefaction taking hold of it, infecteth the rest: As we see in the Embalming of Dead Bodies. And the same reason is, of preserving Herbs, or Fruits, or Flowers, in Bran or Meal.

The ninth is, The commixture of any thing that is more oily or sweet: For such Bodies are least apt to putrifie, the Air working little upon them, and they not putrifying preserve the rest. And therefore we see Syrups and Oylments will last longer than Juices.

The tenth is, The commixture of somewhat that is dry; for Putrefaction beginneth first from the Spirits, and then from the moisture; and that is dry, is unapt to putrifie. And therefore smoak preserveth flesh; as we see in Bacon, and Neats-Tongues, and Martlemas-Beef, &c.

The opinion of some of the Ancients, That blown Airs do preserve Bodies longer than other Airs, feemeth to me probable; for that the blown Airs, being over-charged and comprized, will hardly receive the exhaling of any thing, but rather repulse it. It was tried in a blown Bladder, whereinto flesh was put, and likewise a Flower, and it forcted not: For dry Bladders will not blow, and new Bladders rather further Putrefaction. The way were therefore, to blow strongly with a pair of Bellows, into a Hoghead, putting into the Hoghead (before) that which you would have preferv’d; and in the instant that you withdraw the Bellows, stop the hole close.

The Experiment of Wood that shineth in the dark, we have diligently driven and pursu’d: The rather, for that of all things that give light here below, it is the most durable, and hath least apparent motion. Fire and Flame are in continual expense; Sugar shineth onely while it is in scraping; and Salt-water while it is in dashing; Glowworms have their shineth while they live, or a little after; onely Scales of Fifthes (putrified) seem to be of the same nature with shineth Wood. And it is true, that all Putrefaction hath with it an inward motion, as well as Fire or Light. The tryal forted thus.

1. The shineth is in some pieces more bright; in some more dim; but the most bright of all doth not attain to the light of a Gloworm.
2. The Woods that have been tryed to shine, are chiefly Sallow and Willow; also, the Ash and Halle, it may be, it holdeth in others. 3. Both Roots, and Bodies do shine, but the Roots better. 4. The colour of the shineth part, by day-light, is in some pieces white, in some pieces inclining to red; which in the Country they call the White and Red Carret. 5. The part that shineth, is (for the most part) somewhat soft, and moist to feel to; but some was found to be firm and hard; so as it might be figured into a Crofs, or into Beads, &c. But you must not look to have an Image, or the like, in any thing that is Lightfom; for even a Face in Iron red hot, will
will not be seen, the light confounding the small differences of lighftime and darktime, which shew the figure. 6. There was the shining part pared off, till you came to that, that did not shine; but within two days the part contiguous began also to shine, being laid abroad in the Dew; so as it seemed the putrefaction spreadeth. 7. There was other dead Wood of like kind that was laid abroad, which shined not at the first; but after a nights lying abroad, begin to shine. 8. There was other Wood that did first shine, and being laid dry in the Housfe, within five or six days lost the shining; and laid abroad again, recovered the shining. 9. Shining Woods being laid in a dry room, within a seven night lost their shining; but being laid in a Cellar, or dark room, kept the shining. 10. The boring of holes in that kind of Wood, and then laying it abroad, seemed to conduce to make it shine; the cause is, for that all solution of continuity, doth help on putrefaction, as was touched before. 11. No Wood hath been yet tried to shine that was cut down alive, but such as was rooted both in Stock and Root while it grew. 12. Part of the Wood that shined, was steeped in Oyl and retained the shining a fortnight. 13. The like succeeded in some steeped in Water, and much better. 14. How long the shining will continue, if the Wood be laid abroad every night, and taken in and sprinkled with Water in the day, is not yet tried. 15. Tryal was made of laying it abroad in frosty weather, which hurt it not. 16. There was a great piece of a Root, which did shine, and the shining part was cut off, till no more shined; yet after two nights, though it were kept in a dry Room, it got a shining.

The bringing forth of Living Creatures may be accelerated in two respects: The one, if the Embryon ripeneth and perfecteth sooner; the other, if there be some cause from the Mothers Body of Expulsion or putting it down: Whereof the former is good, and argueth strength; the latter is ill, and cometh by accident or disease. And therefore the Ancient observation is true, that the Child be born in the Seventh Moneth, doth commonly well; but Born in the Eighth Moneth, doth (for the most part) die. But the cause alligned is fabulous, which is, That in the Eighth Moneth should be the return of the reign of the Planet Saturn, which (as they say) is a Planet malign; whereas in the Seventh is the reign of the Moon, which is a Planet propitious. But the true cause is, for that where there is so great a prevention of the ordinary time, it is the lutiness of the Child; but when it is left, it is some indisposition of the Mother.

To Accelerate Growth or Stature, it must proceed; Either from the Plenty of the Nourishment, or from the Nature of the Nourishment, or from the Quickning and Exciting of the Natural heat. For the first, Excess of Nourishment, is hurtful; for it maketh the Child corpulent, and growing in breadth, rather than in height. And you may take an Experiment from Plants, which if they fed much, are seldom tall. As for the Nature of the Nourishment; First, it may not be too dry, and therefore Children in Dairy Countreys do wax more tall, than where they feed more upon Bread and Fitch. There is also a received tale, that boylung of Dulse-Roots in Milk (which it is certain are great dryers) will make Dogs little. But so much is true, That an over-dry Nourishment in Childhood putreth back Stature. Secondly, The Nourishment must be of an opening Nature.
Nature; for that attenuateth the Juyce, and furthereth the Motion of the Spirits upwards. Neither is it without cause, that Xenophon in the Nouriture of the Persian Children, doth so much commend their feeding upon Cardamon, which (he faith) made them grow better, and be of a more active habit. Cardamon is in Latin, Naturarium, and with us Water-cress; which, it is certain, is an Herb, that whilst it is young, is friendly to Life. As for the quickning of Natural Heat, it must be done chiefly with exercitie; and therefore (no doubt) much going to School, where they lies much, hindereth the growth of Children; whereas Country-People, that do not to School, are commonly of better stature. And again, Men must beware how they give Children any thing that is cold in operation; even long sucking doth hinder both Wit and Stature. This hath been tried, that a Whelp that hath been fed with Nitre in Milk, hath become very little, but extremely lively: For the Spirit of Nitre is cold. And though it be an excellent Medicine in strength of years for Pro- longation 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 coldness of the Spirit of Nitre doth help to condence and correct.

There are two great Families of Things, you may term them by several names, Sulphureous and Mercurial, which are the Chymists words: (For as for their Salt, which is their third Principle, it is a Compound of the other two,) Inflamable, and Not Inflamable; Mercurial and Crude Oily and Watry: For we see that in Substantiates there are, as the Fathers of their Tribes, Brimstone and Mercury; In Vegetables and Living Creatures, there is Water and Oyl; in the Inferior order of Ephemerals, there is Air and Flame; and in the Superior, there is the Body of the Star, and the Pure Skey. And these Pairs, though they be unlike in the Primitive Differences of Matter, yet they seem to have many confidents; for Mercury and Sulphure are principal materials of Metals; Water and Oyl are principal materials of Vegetables and Animals, and seem to differ but in Maturation or Concoction. Flame (in Vulgar Opinion) is but Air incendi, and they both have quickness of Motion, and facility of Combustion, much alike: And the Interstellar Skey, (though the opinion be vain, that the Star is the Denier Part of his Orbe,) hath notwithstanding so much affinity with the Star, that there is a rotation of that, as well as of the Star. Therefore, it is one of the greatest Magnalia Nature, to turn Water or Watry Juyce into Oyl or Oly Juyce: Greater in Nature, than to turn Silver or Quick-silver into Gold.

The Instances we have wherein Crude and Watry Substance, turneth into Fat and Oyly, are of four kinds. First, In the Mixture of Earth and Water, which mingled by the help of the Sun, gathered a Nitrous Pat- nelis, more than either of them have severally; As we see, in that they put forth Plants, which need both Juices.

The second is in the Assimilation of Nourishment, made in the Bodies of Plants, and Living Creatures: whereof Plants turn the Juyce of meer Water and Earth, into a great deal of Oyly matter: Living Creatures, though much of their Fat, and Flesh, are out of Oyly Aliments, (as Meat, and Bread,) yet they assimilate also in a measure their Drink of Water, &c.
&c. But these two ways of Version of Water into Oyl, (namely, by Mixture and by Affimilation) are by many Passages, and Percolations; and by continuance of soft Heats, and by circuits of Time.

The third is in the Inception of Putrefaction; as in Water corrupted, and the Mothers of Waters distilled, both which have a kind of Fatness or Oyl.

The fourth is in the Dulcoration of some Metals; as Saetharith Saturn, &c.

The Intention of Version of Water into a more Oly substance is by Digestion: For Oyl is almost nothing else but Water digested and this Digestion is principally by Heat; which Heat must be either outward or inward. Again, it may be by Provocation or Excitation, which is caused by the mingling of Bodies already Oly or Digested, for they will something communicate their Nature with the rest. Digestion also is strongly effected by direct Affimilation of Bodies Crude into Bodies digested; as in Plants and Living Creatures, whose nourishment is far more Crude than their Bodies. But this Digestion is by a great compass as hath been said. As for the more full handling of these two principles, whereof this is but a tafte; (the enquiry of which, is one of the profounde enquirys of Nature,) we leave it to the title of Version of Bodies; and likewise to the title of the Fiift Congregations of Matter, which like a General Assembly of Estates, doth give Law to all Bodies.

A Chameleon is a Creature about the bigness of an ordinary Lizard; his Head unproporcionably big, his eyes great; he moveth his Head without the writhing of his Neck (which is inflexible) as a Hog doth: His Back crooked, his Skin spotted with little Tumors, les eminent nearer the belly, his Tail flender and long; on each Foot he hath five Fingers; three on the outside, and two on the inside; his Tongue of a marvellous length, in respect of his Body, and hollow at the end, which he will lance out to prey upon Flies. Of colour Green, and of a dusky Yellow, brighter and whiter towards the Belly; yet spotted with Blew, White, and Red. If he be laid upon Green, the Green predominatest; if upon Yellow, the Yellow; not so, if he be laid upon Blew, or Red, or White, onely the Green spots receive a more orient lustre; laid upon Black, he looketh all Black, though not without a mixture of Green. He feedeth not only upon Air, (though that be his principal sustenance;) for sometimes he taketh Flies, as was said; yet some that have kept Chameleons a whole year together, could never perceive that ever they fed upon any thing els but Air, and might observe their Bellies to swell after they had exhausted the Air, and closed their Jaws, which they open commonly against the Rays of the Sun. They have a foolish Tradition in Magick, that if a Chameleon be burnt upon the top of an House, it will raise a Tempest, supposing (according to their vain Dreams of Sympathies) because he nourisheth with Air, his Body should have great virtue to make impression upon the Air.

It is reported by one of the Ancients, that in part of Media, there are eruptions of Flames out of Plains, and that those Flames are clear, and cast not forth such smoke, and ashes, and pumice, as Mountain Flames do. The reason (no doubt) is, because the Flame is not pent, as it is in Mountains, and Earthquakes which cast Flame; there be also some blinde Fires, under
under Stone, which flame not out, but Oyl being poured upon them, they flame out. The cause whereof is, for that it seemeth the Fire is so choaked, as not able to remove the Stone, it is heat rather than flame, which nevertheless is sufficient to enflame the Oyl.

It is reported, that in some Lakes the Water is so Nitrous, as if foul Clouds be put into it, it scoureth them of it self: And if they lay any whit long they moulder away. And the scouring Vertue of Nitre is the more to be noted, because it is a Body cold; and we see warm Water scoureth better than cold. But the cause is, for that it hath a subtil Spirit, which severeth and divideth any thing that is foul, and vicious, and sticketh upon a Body.

Take a Bladder, the greatest you can get; full it full of Wind, and tie it about the Neck with a Silk thread waxed; and upon that likewise Wax very close; so that when the Neck of the Bladder drieth, no Air may possibly get in nor out. Then bury it three or four foot under the Earth, in a Vault, or in a Conservatory of Snow, the Snow being made hollow about the Bladder; and after some fortnights Distance, see whether the Bladder be shrunk: For if it be, then it is plain, that the coldness of the Earth or Snow, hath condened the Air, and brought it a degree nearer to Water: Which is an Experiment of great Consequence.

It is a report of some good credit, that in deep Caves there are Pensile Chrysfal, and degrees of Chrysfal that drop from above, and in some other (though more rarely) that rise from below. Which though it be chiefly the work of cold, yet it may be, that Water that pallseth thorow the Earth, gathereth a Nature more clammy, and fitter to congeal, and become solid than Water of it self. Therefore trial would be made to lay a heap of Earth in great Frosts, upon a hollow Vessel, putting a Canvas between, that it falleth not in; and pour Water upon it, in such quantity as will be sure to soak thorow, and see whether it will not make an harder Ice in the bottom of the Vessel, and less apt to dissolve than ordinarily. I suppose also, that if you make the Earth narrower at the bottom than at the top, in fashion of Sugar Loaf reversed, it will help the Experiment. For it will make the Ice, where it isfeth, less in bulk; and evermore smallnes of quantity is a help to Version.

Take Damask Roses and pull them, then dry them upon the top of an Houle, upon a Lead or Tarras in the hot Sun, in a clear day, between the hours (only) of Twelve and two or three about. Then put them into a sweet dry Earthen Bottle or a Glass with narrow mouths, stuffing them close together, but without bruising: Stop the Bottle or Glass close, and these Roses will retain, not onely their smell perfect, but their colour fresh for a yeare at leafe. Note, that nothing doth so much destroy any Plant, or other Body, either by Purification, or Atrefation, as the Advenitious Moisture, which hangeth loose in the Body, if it be not drawn out. For it betrayeth and tolleth forth the Innate and Radicall Moisture along with it when it self goth forth. And therefore in Living Creatures, moderate sweat doth preserve the Juycie of the Body. Note, that these Roses when you take them from the drying, have little or
The continuance of Flame, according unto the diversity of the Body enflamed, and other circumstances, is worthy the enquiry; chiefly, for that though Flame be (almost) of a momentary lasting, yet it receiveth the More, and the Less: We will first therefore speak (at large) of Bodies enflamed, wholly, and immediately, without any Wick to help the Inflammation. A spoonful of Spirit of Wine, a little heated, was taken, and it burnt as long as came to 116 Pulses. The same quantity of Spirit of Wine, mixed with the sixth part of a spoonful of Nitre, burnt but to the space of 94 Pulses. Mixed with the like quantity of Bay-Salt 83 Pulses. Mixed with the like quantity of Gun-powder, which dissolved into a Black-water 110 Pulses. A Cube or Peller of Yellow Wax, was taken, as much as half the Spirit of Wine, and set in the midst, and it burnt only to the space of 87 Pulses. Mixed with the sixth part of a spoonful of Milk, it burnt to the space of 100 Pulses; and the Milk was crumbled. Mixed with the sixth part of a spoonful of Water, it burnt to the space of 86 Pulses; with an equal quantity of Water, only to the space of four Pulses. A small Peble was laid in the midst, and the Spirit of Wine burnt to the space of 94 Pulses. A piece of Wood of the bigness of an Arrow, and about a Fingers length, was set up in the midst, and the Spirit of Wine burnt to the space of 94 Pulses. So that the Spirit of Wine Simple, endureth the longest, and the Spirit of Wine with the Bay-salt, and the equal quantity of Water, were the shortest.

Consider well, whether the more speedy going forth of the Flame, be caused by the greater vigor of the Flame in burning; or by the resistance of the Body mixed, and the aversion thereof to take Flame: Which will appear by the quantity of the Spirit of Wine, that remaineth after the going out of the Flame. And it seemeth clearly to be the latter, for that the mixture of things least apt to burn, is the speediest in going out, and note by the way, that Spirit of Wine burned, till it go out of itself, will burn no more, and tafteth nothing (so hot in the mouth as it did: no nor yet four, (as if it were a degree towards Vinegar) which burnt Wine doth, but flat and dead.

Note, that in the Experiment of Wax aforesaid, the Wax dissolved in the burning, and yet did not incorporate it itself with the Spirit of Wine, to produce one Flame; but where over the Wax floated, the Flame took it; till at last it spread all over, and put the Flame quite out.

The Experiments of the Mixtures of the Spirit of Wine enflamed, are things of discovery, and not of use: But now we will speak of the continuance of Flames, such as are used for Candles, Lamps, or Tapers, consisting of Inflammable Matters, and of a Wick that provokes the Inflammation. And this importeth not only discovery, but also use and profit: for it is a great saving in all such Lights, if they can be made as fair and right as others, and yet last longer. Wax pure made into a Candle, and Wax mixed severally into Candle-stuff with the particulars that follow, (Viz. Water, Aquavitae, Milk, Bay-salt, Oyl, Butter, Wine, Brimstone, Saw dust,) every of these being a sixth part to the Wax; and every of these Candles mixed, being of the same weight and wick, with the Wax pure; proved thus in the burning, and lasting. The twofold in consuming was that with Saw-dust, which first burned fair till some part of the Candle was consumed; and
and the dust gathered about the snuff; but then it made the snuff big, and long, and to burn briskly, and the candle wasted in half the time of the wax pure. The next in swiftness, were the oil and butter, which consumed by a fifth part swifter than the pure wax. Then followed in swiftness the clear wax is kind; then the bay-flame, which lasted about an eight part longer than the clear wax; then followed the aqua-vite, which lasted about a fifth part longer than the clear wax; then follow the milk and water, with little difference from the aqua-vite, but the water flowed. And in these four last, the wick would spit forth little sparks: for the nitre, it would not hold lighted above some twelve pulses: but all the while it would spit out portions of flame, which afterwards would go out into a vapor. For the brimstone, it would hold lighted much about the same with the nitre; but then after a little while, it would harden and cake about the snuff: so that the mixture of bay-flame with wax, will win an eighth part of the time of lasting, and the water a fifth.

After the several materials were tried, trial was likewise made of several wicks: as of ordinary rotten, so in thread, rush, silk, straw, and wood. The silk, straw, and wood; would flame a little, till they came to the wax, and then go out; of the other three, the thread 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 bigness of the flame, the cotton, and thread, cast a flame much alike, and the rush much less and dimmer. quere, whether wood and wicks both, as in torches consume faster, than the wicks simple?

We have spoken of the several materials, and the several wicks, but to the lasting of the flame, it importeth also, not only, what the material is, but in the same material, whether it be hard, soft, old, new, &c. Good housewives to make their candles burn the longer, use to lay them (one by one) in bran or flower, which makes them harder, and so they consume the flower. Insomuch, as by this means they will out-last other candles of the same stuff, almost half in half. For bran and flower have a virtue to harden, so that both age, and lying in the bran both help to the lasting. And we see that wax candles last longer then tallow-candles, because wax is more firm and hard.

The lasting of flame also dependeth upon the ease drawing of the nourishment; as we see in the court of England, there is a service which they call all-night; which is (as it were) a great cake of wax, with the wick in the midst; whereby it cometh to pass, that the wick fetcheth the nourishment further off. We see also, that lamps last longer, because the vessel is far broader than the breadth of a taper or candle.

Take a turretted lamp of tin made in the form of a square; the height of the turrett, being thrice as much as the length of the lower part, whereupon the lamp standeth; make one hole in it, at the end of the return furthest from the turrett. Reverse it, and fill it full of oil, by that hole; and then let it upright again, and put a wick in at the hole, and lighten it. You shall finde that it will burn low, and a long time: Which is cauled (as was said before) for that the flame fetcheth the nourishment a far off. You shall finde also, that as the oil waketh and descendeth, so to the top of the turrett, by little and little filleth with air; which is cauled by the rarefaction of the oil by the heat. It were worthy the observation to make a hole, in the top of the turrett, and to try, when the
the Oyl is almost consumed, whether the Air made of the Oyl, if you put to it a flame of a Candle, in the letting of it forth, will enflame. It were good also to have the Lamp made, not of Tin, but of Glass; that you may see how the Vapor or Air gathereth by degrees in the top.

A fourth point, that importeth the letting of the Flame, is the closeness of the Air, wherein the Flame burneth. We see, that if Wind bloweth upon a Candle, it wasteth space; we see also, it lasteth longer in a Lantern, than at large. And there are Traditions of Lamps and Candles, that have burnt a very long time in Caves and Tombs.

A fifth point, that importeth the letting of the Flame, is the Nature of the Air where the Flame burneth; whether it be hot or cold, moist or dry. The Air, if it be very cold, irritateth the Flame, and maketh it burn more fiercely, (as Fire scorseth in Frosty weather) and so furthereth the Conflagration. The Air once heated, (I conceive) maketh the Flame burn more mildly, and so helpeth the continuance. The Air, if it be dry, is indifferent; the Air, if it be moist, doth in a degree quench the Flame, (as we see Lights will go out in the Damps of Mines;) and howsoever maketh it burn more dully, and so helpeth the continuance.

Burlials in Earth serve for Preservation, and for Condensation, and for Induration of Bodies. And if you intend Condensation or Induration, you may bury the Bodies so, as Earth may touch them; as if you would make Artificial Procellane, &c. And the like you may do for Conservation, if the Bodies be hard and solid, as Clay, Wood, &c. But if you intend Preservation of Bodies, more soft and tender, then you must do one of these two: Either you must put them in cases, whereby they may not touch the Earth; or else you must Vault the Earth, whereby it may hang over them, and not touch them: For if the Earth touch them, it will do more hurt by the moisture, causing them to putri[e] than good by the virtual cold, to conserve them, except the Earth be very dry and sandy.

An Orange, Lemon, and Apple, wrapped in a Lining Cloth, being buried for a fortnights space four foot deep within the Earth, though it were in a moist place, and a rainy time; yet came forth no ways mouldy or rotten, but were become a little harder than they were, otherwise fresh in their colour, but their Juice somewhat flatted. But with the Burial of a fortnight more, they become putrified.

A Bottle of Beer buried in like manner as before, became more lively, better tailed, and clearer than it was: And a Bottle of Wine, in like manner. A Bottle of Vinegar so buried, came forth more lively and more odoriferous, smelling almost like a Violet. And after the whole Moneths Burial, all the three came forth as fresh and lively, if not better than before.

It was a profitable Experiment, to preserve Oranges, Lemons, and Pomegranates, till Summer; for then their price will be mightily encreased: This may be done, if you put them in a Pot or Vessel well covered, that the moisture of the Earth come not at them; or else by putting them in a Conservatory of Snow. And generally, whoever will make Experiments of Cold, let him be provided of three things, a Conservatory of Snow, a good large Vault, twenty foot at least under the Ground, and a deep Well.

There
Natural History;

There hath been a Tradition, that Pearl, and Coral, Surchoiz-Stone, that have lost their Colours, may be recovered by burying in the Earth; which is a thing of great profit, if it would sort: But upon trial of fix weeks Burial, there followed no effect. It were good to try it in a deep Well, or in a Conservatory of Snow, where the cold may be more stringent, and to make the Body more united, and thereby more resplendent.

Mens Bodies are heavier and less disposed to Motion when Southern Winds blow, then when Northern. The cause is, for that when the Southern Winds blow, the Humors do (in some degree) melt, and wax fluid, and so flow into the parts; as it is seen in Wood, and other Bodies, which when the Southern Winds blow, do swell. Besides, the Motion and Activity of the Body consisteth chiefly in the sinews, which, when the Southern Wind bloweth, are more relax.

It is commonly seen, that more are sick in the Summer, and more die in the Winter; except it be in Pestilent Diseases, which commonly reign in Summer or Autumn. The reason is, because Diseases are bred (indeed) chiefly by Heat; but then they are cured most by Sweat and Purge, which in the Summer cometh on, or is provoked more easily: As for Pestilent Diseases, the reason why most die of them in Summer, is because they are bred most in the Summer; for otherwise, those that are touched are in most danger in the Winter.

The general opinion is, That Years hot and moist, are most Pestilential; upon the superficial Ground, that Heat and Moisture cause Putrefaction. In England it is found not true: for, many times, there have been great Plagues in dry years. Whereof the cause may be, for that drought in the Bodies of Islanders, habituate to moist Airs, doth exasperate the Humors, and maketh them more apt to Putrisse or Enflame; besides, it triesth the Waters (commonly) and maketh them less wholesome. And again in Barbary, the Plagues break up in the Summer, Moneths, when the Weather is hot and dry.

Any Diseases (both Epidemical and others) break forth at particular times. And the cause is falsely impouted to the constitution of the Air, at that time, when they break forth or reign; whereas it proceedeth (indeed) from a Precedent Sequence, and Series of the Seasons of the Year: And therefore Hapaxes, in his Prognosticks, doth make good observations of the Diseases, that ensue upon the Nature of the precedent four Seasons of the Year.

Rival hath been made with Earthen Bottles, well stopp'd, hanged in a Well of Twenty Fathom deep, at the least; and some of the Bottles have been let down into the Water, some others have hanged above, within about a Fathom of the Water; and the Liquors so try'd have been, Beer, (not new, but ready for drinking) and Wine, and Milk. The proof hath been, that both the Beer, and the Wine, (as well within Water, as above) have not been palled or deaded at all; but as good, or somewhat better than Bottles of the same Drinks and Staleness, kept in a Cellar. But those which did hang above Water, were apparently the best: and that Beer did flower.
flower a little; whereas that under water did not, though it were fresh. The milk foured, and began to putrif. Nevertheless it is true, that there is a village near Blois, where in deep caves they do thicken milk, in such a sort, that it becometh very pleasant; which was some cause of this tryst of hanging milk in the well: But our proof was naught, neither do I know, whether that milk in those caves be first boiled. It were good therefore to try it with milk sodden, and with cream; for that milk of itself is such a compound body of cream, cruds, and whey, as it is easily turned and dissolved. It were good also to try the beer, when it is in wort, that it may be seen, whether the hanging in the well will accelerate the ripening and clarifying of it.

Divers, we see, do sturt. The cause may be (in most) the refrigeration of the tongue, whereby it is less apt to move; and therefore we see, that naturals do generally sturt: And we see, that in those that sturt, if they drink wine moderately, they sturt less, because it heats them: And so we see, that they that sturt, do sturt more in the first offer to speak, than in continuance; because the tongue is, by motion, somewhat heated. In some also, it may be (though rarely) the dryness of the tongue, which likewise maketh it less apt to move as well as cold; for it is an affront that cometh to some wits and great men, as it did unto Moses, who was lingua praedicta: And many stutters (we finde) are very cholericke men, cholerae enduring a dryness in the tongue.

Smells, and other odors, are sweeter in the air, at some distance, than near the nose; as hath been partly touched heretofore. The cause is double, first, the finer mixture, or incorporation of the smell. For we see, that in sounds like wise, they are sweeter, when we cannot hear every part by itself. The other reason is, that all sweet smells have joined with them some earthy or crude odors; and at some distance the sweet, which is the more spiritual, is perceived; and the earthy reacheth not so far.

Sweet smells are most forcible in dry substances, when they are broken; and so likewise in oranges or lemons, the nipping off their rinde, giveth out their smell more: And generally, when bodies are moved or sifted, though not broken, they smell more, as a sweet-bag waved. The cause is double; the one, for that there is a greater emission of the spirit, when way is made: And this holdeth in the breaking, nipping, or crushing; it holdeth also, (in some degree) in the moving. But in this last, there is a concurrence of the second cause, which is the impulsion of the air, that bringeth the scent faster upon us.

The daintiest smells of flowers, are out of those plants whose leaves smell not; as violet, roses, wall-flowers, gilly-flowers, pink, wood-bine, vine-flowers, apple-blossoms, lime-tree-blossoms, bean-blossoms, &c. The cause is, for that where there is heat and strength enough in the plant to make the leaves odorous, there the smell of the flower is rather evanished and weaker, than of the leaves; as it is in rosemary-flowers, lavender-flowers, and sweet-brier roses: But where there is less heat, there the spirit of the plant is digested and refined, and fermented, from the greater juice in the efflorescence, and not before.
N**atural History**

Most Odors smell best, broken, or crusty, as hath been said; but Flowers pressed or beare, do lose the freshnes and sweetneth of their Odor. The cause is, for that when they are crusty, the groffer and more earty Spirit cometh out with the Finer, and troubleth it: whereas in stronger Odors there are no such degrees of the issue of the smell.

It is a thing of very good use, to discover the goodness of Waters. The taste to those that drink Water onely doth somewhat: But other Experiments are more sure. First, try Waters by weight, wherein you may finde some difference, though not much: And the lighter, you may account the better.

Secondly, Try them by boiling upon an equal fire; and that which consumeth away fatest, you may account the best.

Thirdly, Try them in severall Bottles or open Vessells, matches in every thing else, and see which of them last longest without fench or corruption; and that which holdeth unputrid longeft, you may likewise account the best.

Fourthly, Try them by making Drinks, stronger or smaller, with the same quantity of Malt: and you may conclude, that that Water, which maketh the stronger Drink, is the more concocted and nourishing: though perhaps it be not so good for Medicinal use. And such VVater (commonly) is the VVater of large and navigable Rivers; and likewise in large and clean Ponds of standing VVater: For upon both them, the Sun hath more power than upon Fountains, or small Rivers. And I conceive, that Chalk-water is next them the best, for going furtheft in Drink. For that also helpeth concoction, so it be out of a deep VVell; for then it curseth the rawnes of the VVater; but Chalky-water towards the top of the Earth, is too frettin, as it appeareth in Laundry of Cloaths, which wear outapace, if you use such VVaters.

Fifthly, The Housewifes do finde a difference in Waters, for the bearing or not bearing of Soap; and it is likely, that the more fat water will bear Soap bett, for the hungry water doth kill the unctuous nature of the Soap.

Sixthly, You may make a judgment of Waters according to the place, whence they spring or come. The Rain-water is by the Physiitans esteemed the finest and the bett; but yet it is said to putrisce soonest, which is likely, because of the finest of the Spirit; and in Conservatories of Rain-water, (such as they have in Venice, &c.) they are found not so choice Waters; (the worse perhaps) because they are covered aloft, and kept from the Sun. Snow-water is held unwholefome, inomuch, as the people that dwell at the Foot of the Snow Mountains, or otherwise upon the ascent, (especially the VVomen) by drinking of Snow-water, have great bags hanging under their Throats. VVell VVater, except it be upon Chalk, or a very plentiful Spring maketh Meat red, which is an ill sign. Springs on the tops of high Hills are the bett; for both they seem to have a Lightnes and Appetite of Mounting; and besides, they are most pure and unmingled: And again are more percolated through a great space of Earth. For VVaters in Valleys, joyn in effect under ground with all VVaters of the same Level; whereas Springs on the tops of Hills, pass through a great deal of pure Earth with les mixture of other VVaters.

Seventhly, Judgment may be made of Waters by the Soyl whereupon the VVater runneth, as Pebble is the cleanest and bett tafted; and next to that Clay.
Century IV.

Clay-water; and thirdly, Water upon Chalk; Fourthly, that upon Sand; and worst of all, upon Mud. Neither may you trust Waters that taste sweet, for they are commonly found in Rising-grounds of great Cities, which must needs take in a great deal of filth.

In Peru, and divers parts of the West-Indies, though under the Line, the Heats are not so intolerable, as they be in Barbary, and the Skirts of the Torrid Zone. The causes are, first, the great Brizes which the motion of the Airing great Circles (such as are under the Girdle of the World) produceth, which do refrigerate; and therefore in those parts, Noon is nothing so hot when the Brizes are great, as about nine or ten of the clock in the Forenoon. Another cause is, for that the length of the Night, and the Dews thereof, do compensate the Heat of the day. A third cause is, the stay of the Sun; not in respect of day and night (for that we spake of before) but in respect of the Season: For under the Line, the Sun croseth the Line, and maketh two Summers and two Winters; but in the skirts of the Torrid Zone, it doubleth and goeth back again, and so maketh one long Summer.

The heat of the Sun maketh Men black in some Countreys, as in Ethiopia and Guinea, &c. Fire doth it not as we see in Glafs-Men, that are continually about the Fire. The reason may be, because Fire doth lick up the Spirits and Blood of the Body, so as they exhale; so that it ever maketh Men look Pale and Sallow; but the Sun which is a gentler heat, doth but draw the Blood to the outward parts, and rather concreteth it, then foketh it: And therefore, we see that all Ethiopians are fleshy, plump, and have great Lips. All which betoken moisture retained, and not drawn out. We see also, that the Negroes are bred in Countries that have plenty of Water, by Rivers or otherwise: For Mero, which was the Metropolis of Ethiopia, was upon a great Lake; and Congo, where the Negroes are, is full of Rivers. And the confines of the River Niger, where the Negroes also are, are well watered; and the Region about Capo Verde is likewise moift, inomuch, as it is pelitious through moisture: But the Countrys of the Abyssen, and Barbary, and Peru, where they are Tawney and Olivalter, and Pale, are generally more sandy and dry. As for the Ethiopians, as they are plump and fleshy, so (it may be) they are Sanguine and Ruddy coloured, if their Black Skin would suffer it to be seen.

Some Creatures do move a good while after their head is off, as Birds. Some a very little time, as Men and all Beasts. Some move, though cut in several pieces, as Snakes, Eels, Worms, Flies, &c. First, therefore it is certain, that the immediate cause of Death, is the resolution or extingishment 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 extingishment 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 loved after the Heart hath been severed; and it is a report also of credit, that the Head of a Pig hath been opened, and the Brain put into the Palm of a Mans Hand, trembling, without breaking any part of it, or severing it from the Marrow of the Back-bone: during which time, the Pig hath been, in all appearance, stark dead, and without motion: And after a small time the Brain hath been replaced, and
and the Skull of the Pig closed, and the Pig hath a little after gone about. And certain it is, that an Eye upon Revenge, hath been thrust forth, so as it hanged a pretty distance by the Visual Nerve; and during that time, the Eye hath been without any power of Sight; and yet after (being replaced) recovered Sight. Now the Spirits are chiefly in the Head, and Cells of the Brain, which in Men and Beasts are large; and therefore, when the Head is off, they move little or nothing: But Birds have small Heads, and therefore the Spirits are a little more dispersed in the Sinews, whereby Motion remaineth in them a little longer; insomuch, as it is extant in story, that an Emperor of Rome, to shew the certainty of his hand, did shoot a great Forked Arrow at an Ebirch, as she ran swiftly upon the Stage, and stroke off her Head; and yet she continued the race a little way with her Head off. As for Worms, and Flies, and Eels, the Spirits are diffused almost all over; and therefore they move in their several pieces.
E will now enquire of Plants or vegetables; and we shall do it with diligence. They are the principal part of the Third days Work; they are the first Producers, which is the word of Animation, for the other words are but the words of Ehasence; and they are of excellent and general use. For Food, Medicine, and a number of Medicinal Arts.

There were sown 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 rooted; this was laid upon a Bank half a foot high, and supported round about with Planks; and upon the top was cast fitted Earth, some two fingers deep; and then the Seed sprinkled upon it, having been steeped all night in Water mixed with Cow-dung. The Turnip-seed, and the Radish, came up half an inch above ground, within two days after, without any watering; the rest the third day. The Experiment was made in October, and (it may be) in the Spring, the Accelerating would have been the speedier. This is a noble Experiment; for, without this help, they would have been four times as long in coming up. But there doth not occur to me, at this present, any use thereof, for profit, except it should be for Sowing of Pease, which have their price very much increased by the early coming. It may be tried also with Cherries, Strawberries, and other Fruit which are dearer, when they come early.

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 Urine of Man, other in Water mixed with Chalk powdered, 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, have that there was not of the Salt above an eighth part. The Urine, and Winds, and Spirit of Wine, were simple without mixture of Water; the time of steeping was twelve hours; the time of the year October. There was also other Wheat sown unsteeped, but watered twice a day with warm Water; there was also other Wheat sown simple, to compare it with the rest. The event was, that those that were in the mixture of Dung, and Urine, Soot, Chalk, Ashes, and Salt, came up within six days; and those that afterwards proved the highest, thickest, and most lusty, were, first the Urine, and then the Dungs; next the Chalk, next the Soot, next the Ashes, next the Salt, next the Wheat simple of it self unsteeped and unwatered, next the watered twice a day with warm Water next the Claret Wine. So that these three last were flower than the ordinary Wheat of it self; and this Culture did rather retard than advance. As for those that were steeped in Malmsey, and Spirit of Wine, they came not up at all. This is a rich Experiment for profit; for the motto of the steepings are cheap things, and the goodness of the crop is a great matter of gain; if the goodness of the crop answer the earliness of the coming up, as it is like it will, both being from the vigor of the Seed; which also partly appeared in the former Experiment, as hath been said. This Experiment would be tried in other Grains, Seeds, and Kernels; for it may be some steeping will agree best with some Seeds. It would be also tried with Roots steeped as before, but for longer time; it would be tried also in several feasons of the Year, especially in the Spring.

Strawberries watered now and then (as once in three days) with Water, wherein hath been steeped Sheeps-dung, or Pigeons-dung, will prevent and come early. And it is like the same effect would follow in other Berries, Herbs, Flowers, Grains, or Trees; and therefore it is an Experiment, though vulgar in Strawberries, yet not brought into use generally: For it is usual to help the Ground with Muck, and likewise to enrich it with some Muck put to the Roots, but to water it with Muck-water, which is like to be more forcible, is not practiced.

Dung, or Chalk, or Blood, applied in substance (for the use) to the Roots of Trees, doth set them forwards. But to do it unto Herbs, without mixture of Water or Earth, it may be these helps are too hot.

The former means of helping Germination, are either by the goodness and strength of the Nourishment, or by the comforting and exciting the Spirits in the Plant, to draw the Nourishment better. And of this latter kind concerning the comforting of the Spirits of the Plant, are also the experiments that follow; though they be not applications to the Root or Seed. The planting of Trees warm upon a Wall, against the South or South-East Sun, doth hasten their coming on and ripening; and the South-East is found to be better than the South-West, though the South-West be the hotter Coast. But the cause is chiefly, for that the heat of the morning succeeds the cold of the night; and partly, because (many times) the South-West Sun is too parching. So likewise planting of them upon the Back of a Chimney where a fire is kept, doth hasten their coming on, and ripening: Nay more, the drawing of the Boughs into the inside of a room, where a Fire is continually kept, worketh the same effect; which hath
hath been tried with Grapes; insomuch, as they will come a Moneth earlier, then the Grapes abroad.

Besides the two Means of Accelerating Germination, formerly described; that is to say, the mending of the Nourishment; comforting of the Spirit of the Plant; there is a third, which is the making way for the ease coming to the Nourishment, and drawing it. And therefore gentle digging and loofing of the Earth about the Roots of Trees, and the removing Herbs and Flowers into new Earth, once in two years (which is the same thing, for the new Earth is ever looser) doth greatly further the prospering and earliness of Plants.

But the most admirable Acceleration by facilitating the Nourishment, is that of Water. For a Standard of a Damask Rose with the Root on, was set in a Chamber, where no Fire was, upright in an Earthen Pan, full of fair Water, without any mixture, half a foot under the Water, the Standard being more than two foot high above the Water. Within, in the space of ten days, the Standard did put forth a fair green Leaf, and some other little Buds, which flood at a lay without any shew of decay or withering, more then seven days. But afterwards that Leaf faded, but the young Buds did sprout on, which afterward opened into fair Leaves, in the space of three Moneths, and continued for a while after, till upon removal were left the tary. But note, that the Leaves were somewhat paler, and light-coloured, then the Leaves use to be abroad. Note, that the first Buds were in the end of October, and it is likely, that if it had been in the Spring time, it would have put forth with greater strength, and (it may) be to have grown on to bear Flowers. By this means, you may have (as it feemeth) Roses fett in the midst of a Pool, being supported with some fay, which is matter of rareness and pleasure, though of small use. This is the more strange, for that the like Rose Standard was put at the same time, into Water mixed with Horse-dung, the Horse-dung about the fourth part to the Water, and in four Moneths space (while it was observed) put not forth any Leaf, though divers Buds at the firk, as the other.

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

Note, that if Roots, or Peafe, or Flowers may be accelerated in their coming and ripening, there is a double profit: the one in the high price that those things bear when they come early; the other in the swiftness of their returns: For in some Grounds which are strong, you shall have a Raddish, &c. come in a moneth, that in other Grounds will not come in two, and so make double returns.

Wheat also was put into the Water, and came not forth at all; so as it feemeth there must be some strength and bulk in the Body, put into the Water, as it is in Roots: for Grains, or Seeds, the cold of the Water will mortifie. But casually some Wheat lay under the Pan, which was somewhat moistened by the suing of the Pan, which in six weeks (as a foresaid) looked mouldy to the eye, but it was sprouted forth half a fingers length.

It feemeth by these Inflances of Water, that for nourishment the Water is almost all naile, and that the Earth doth but keep the Plant upright, and save it from over-heat, and over-cold; and therefore is a comfortable Experiment for good Drinkers. It proveth also that our former opinion, that Drink
Drink incorporate with Flesh or Roots (as in Capon-Beer, &c.) will nourish more easily than Meat and Drink taken severally.

The Houting of Plants (I conceive) will both Accelerate Germination, and bring forth Flowers and Plants in the colder Seasons: And as we Housethor Country Plants, as Lemmons, Oranges, Myrtles, to save them; so we may Houset our own Country Plants to forward them, and make them come in the cold Seasons, in such fort, that you may have Violets, Strawberries, Peas, all Winter: So that you low or remove them at fit times. This Experiment is to be referred unto the comforting of the Spirit of the Plant by warmth as well as Houting their Boughs, &c. So then the means to Accelerate Germination, are in particular eight, in general three.

To make Roses or other Flowers come late, it is an Experiment of Pleasure. For the Ancients esteemed much of Rosa Sera, and indeed the November Rose is the sweetest, having been left exhale by the Sun. The Means are these, First, The cutting off their tops immediately after they have done bearing, and then they will come again the same year about November; but they will not come just on the tops where they were cut, but out of those Shoots which were (as it were) Water-boughs. The cause is, for that the Sap, which otherwise would have led the top, (though after bearing) will, by the discharge of that, divert unto the Side-sprouts, and they will come to bear, but later.

The second is the Pulling of the Buds of the Rose, when they are newly knotted, for then the side Branches will bear. The cause is the same with the former: For cutting off the Tops, and pulling off the Buds, work the same effect, in Retention of the Sap for a time, and Diversion of it to the Sprouts that were not so forward.

The third is the cutting off some few of the Top-boughs in the Spring time but suffering the lower Boughs to grow on. The cause is, for that the Boughs do help to draw up the Sap more strongly; and we see that in Pouling of Trees, many do use to leave a Bough or two on the top to help to draw up the Sap. And it is reported also, That if you graft upon the Bough of a Tree, and cut off some of the old Boughs, the new Cions will perish.

The fourth is by laying the Roots bare about Christmas some days. The cause is plain, for that it doth arrest the Sap from going upwards for a time; which arrest is afterwards released by the covering of the Root again with Earth, and then the Sap gethter up, but later.

The fifth is the removing of the Tree some Moneth before it Budgeth. The cause is, for that some time will be required after the Remove, for the Refletting, before it can draw the Juyce; and that time being lost, the blossom must needs come forth later.

The sixth is the Grafting of Roses in May, which commonly Gardiners do not till July, and then they bear not till the next year; but if you graft them in May, they will bear the same year, but late.

The seventh is the Girding of the Body of the Tree about with some Packthread; for that also in a degree restraineth the Sap, and maketh it come up more late, and more slowly.

The eighth is the Planting of them in a Shade or in a Hedge. The cause is, partly the keeping out of the Sun, which haltneth the Sap torisfe, and partly the robbing of them of Nourishment by the stuff in the Hedge; these
these means may be practiced upon other, both Trees, and Flowers, Musafris mutandis.

Men have entertained a conceit that she weth prettily, namely, That if you graft a late-coming Fruit, upon a Stock of a Fruit-tree that cometh early, the Graft will bear Fruit early, as a Peach upon a Cherry: And contrariwise, if an Early-coming Fruit upon a Stock of a Fruit-tree that cometh late, the Graft will bear Fruit late, as a Cherry upon a Peach. But these are but imaginations, and untrue. The cause is, for that the Grafts over-ruleth the Stock quite, and the Stock is but Passive only, and giveth Aliment, but no Motion to the Graft.

We will speak now, how to make Fruits, Flowers, and Roots larger, in more plenty and sweeter than they use to be; and how to make the Trees themselves more tall, more speedy, and more hasty and sudden, than they use to be. Wherein there is no doubt, but the former experiments of Acceleration will serve much to these purposes. And again, that these Experiments which we shall now let down, do serve also for Acceleration, because both effects proceed from the encrease of Vigor in the Tree; but yet to avoid confusion. And because some of theMeans are more proper for the one effect, and some for the other. We will handle them apart.

It is an assured Experience, That an heap of Flint or Stone, laid about the bottom of a wilde Tree, (as in Oak, Elm, Ash, &c.) upon the first planting, doth make it prosper double as much as without it. The cause is, that it retainteth the moisture which falleth at any time upon the Tree, and suffereth it not to be exhailed by the Sun. Again, it keepeth the Tree warm from cold Blasts and Frosts, as it were in a Houle. It may be also, there is somewhat in the keeping of it steady at the first. Quere, if laying of Straw some height about the Body of a Tree, will not make the Tree forwards: For though the Root giveth the Sap, yet is it the Body that draweth it. But you must note, that if you lay Stones about the Stalk of Lettuce, or other Plants that are more f.of, it will over-moisten the Roots, so as the Worms will eat them.

A Tree at the first setting, should notbe shaken, until it hath taken Root fully; And therefore some have put too little Forks about the bottom of their Trees, to keep them upright; but after a years rooting, then shaking doth the Tree good by loosening of the Earth, and (perhaps) by exercising (as it were) and stirring the Sip of the Tree.

Generally, the cutting away of Boughs and Suckers at the Root and Body, doth make Trees grow high; and contrariwise, the Poling and Cutting of the top, maketh them grow, speed, and bushy: as we see in Pollards, &c.

It is reported, That to make hasty growing Coppice wood, the way is, to take Willow, Sallow, Poplar, Alder, of some seven years growth: and to set them, not upright, but a-slope, a reasonable depth under the Ground; and then instead of one Root they will put forth many, and so carry more shoots upon a Stem.

When you would have many new Roots of Fruit-Trees, take a low Tree, and bow it, and lay all his Branches a flat upon the ground, and call Earth upon them, and every twig will take Root. And this is a very profitable Experiment for costly Trees; (for the Boughs will make Stocks without charge) such as are Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.
From May to July you may take off the Bark of any Bough, being of the bignets of Three or four Inches, and cover the bare place, somewhat above and below with Loam, well tempered with Horse-dung, binding it fast down. Then cut off the Bough about 3 or 4 Inches in the bare place, and set it in Ground, and it will grow to be a fair Tree in one year. The cause may be, for that the Bearing from the Bark, keepeth the Sap from descending towards Winter, and so holdeth it in the Bough; and it may be also, that Loam and Horse-dung applied to the bare place, do moisten it and cherish it, and make it more apt to put forth the Root. Note, that this may be a general means for keeping up the Sap of Trees in their Boughs, which may serve to other effects.

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

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

It is usuall practised to set Trees that require much Sun, upon Walls against the South; as Apricots, Peaches, Plumbs, 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 growth round, the upper Boughs over shadow the lower, but when it is spred upon a Wall, the Sun cometh alike upon the upper and lower Branches.

It hath also been practised (by some) to pull some Leaves from the Trees so spred, that the Sun may come upon the Bough and Fruit the better. There hath been practised also a curiosity, to set a Tree upon the North side of a Wall, and at a little height, to draw him through the Wall, and spred him upon the South side; conceiving, that the Root and lower part of the Stock should enjoy the freshness of the shade, and the upper Boughs and Fruit, the comfort of the Sun; but it sorteth not. The cause is, for that the Root requireth some comfort from the Sun, though under Earth, as well as the Body; and the lower part of the Body more than the upper, as we see in compaifying a Tree below with straw.

The lownefs of the Bough, where the Fruit cometh, maketh the Fruit greater, and to ripen better; for you shall ever see in Apricots, Peaches, or Melo-Corones upon a Wall, the greatest Fruits towards the bottom. And in France the Grapes that make the Wine, grow upon the low Vines, bound to small Stakes; and the railed Vines in Arbors, make but Verjuice. It is true, that in Italy, and other Countries where they have hotter Sun, they raise them upon Elms and Trees: But I conceive, that if the French manner of Planting low, were brought inuse, their Wines would be stronger and sweeter: But it is more chargeable in respect of the Props. It were good to try whether a Tree grafted somewhat near the ground, and the lower Boughs onely maintained, and the higher continually proyned off, would not make a larger Fruit.

To have Fruit in greater Plenty, the way is to graft, not onely upon young Stocks, but upon divers Boughs of an old Tree; for they will bear great
great numbers of Fruit; whereas if you graft but upon one Stock, the Tree can bear but few.

The digging yearly 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 unto other Trees and Shrubs, (as Roses, &c.) I conceive, would advance them likewise.

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

To revive an Old Tree, the digging of it about the Roots, and applying new Mould to the Roots, is the way. We see also that Draught-Oxen put into fresh Pasture, gather new and tender flesh; and in all things, better nourishment than hath been used, doth help to renew, especially, if it be not only better but changed, and differing from the former.

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

If *Rumicium* be laid below, and about the bottom of a Root, it will cause the Root to grow to an excessive bigness. The cause is, for that being it self of a spiny substance, it draweth the moisture of the Earth to it, and doth feedeth the Root. This is of greatest use for *Onions*, *Turnips*, *Parsnips*, and *Cattails*.

The shifting of Ground is a means to better the Tree and Fruit; but with this Caution, That all things do prosper best, when they are advanced to the better. Your Nursery of Stocks ought to be in a more barren Ground, than the Ground is whcreinto you remove them. So all *Grafters* prefer their Cattle from meaner Pastures to better. We see also, that hardness in youth lengtheneth life, because it leaveth a cherishing to the better of the Body in Age: Nay, in exercises it is good to begin with the hardest, as Dancing in thick Shooses, &c.

It hath been observed, that hacking of Trees in their Bark, both down-right, and a crois, so as you make them rather in slices, than in continued Hacks, doth great good to Trees, and especially delivereth them from being Hide-bound, and killeth their Mols.

Shade to some Plants conduceth to make them large and prosperous more than Sun; as in Strawberries, and Bays, &c. Therefore amongst Strawberries, sow here and there some *Borage-Seed* and you shall finde the Strawberries under thole Leaves, far more large than their fellows. And Bays you must plant to the North, or defend them from the Sun by a Hedg Row; and when you sow the Berries, weed not the Borders for the first half year; for the Weed giveth them Shade.

To increase the Crops of Plants, there would be considered, not only the increasing the Luft of the Earth, or of the Plant, but the saving also of that which is spilt. So they have lately made a tryal to set *Wheat*, which nevertheless hath been left off, because of the trouble and pains; yet so much is true, that there is much saved by the Setting, in companion of that
that which is Sown; both by keeping it from being picked up by Birds, and
by avoiding the shalow lying of it, whereby much that is sown, taketh no
Root.

It is prescribed by some of the Ancients, that you take small Trees, upon
which Figs or other Fruit grow, being yet unripe, and cover the Trees in
the middle of Autumn with Dung until the Spring, and then take them
up in a warm day, and replant them in good Ground; and by that means,
the former years Tree will be ripe, as by a new Birth, when other Trees of
the same kinde do but blossom. But this seemeth to have no great pro-
bability.

It is reported, That if you take Nitre, and mingle it with Water, to
the thicknes of Honey, and therewith anoint the Bud, after the Vine is cut,
it will sprout forth within eight days. 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 Veget-
tables.

Take Seed or Kernels of Apples, Pears, Oranges; or a Peach, or a Plumb-
Stone &c. And put them into a Squill, (which is like a great Onion) and they
will come up much earlier than in the Earth it seld. This I conceive to be as
a kinde of Grafting in the Root; for as the Stock of a Graft yieldeth 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
Kernels into a Turnip, or the like, save that the Squill is more vigorous and
hot. It may be tried also, with putting Onion-Seed into an Onion-
Head, which thereby (perhaps) will bring forth a larger and earlier
Onion.

The pricking of a Fruit in severall places, when it is almost at his big-
ness, and before it ripeneth, hath been practised with success, to ripen the
Fruit more suddenly. We see the example of the biting of Wasps or Worms
upon Fruit (whereby it manifestly ripeneth the sooner.

It is reported, That Alga Marina (Sea-seed) put under the Roots of
Colworts, and (perhaps) of other Plants, will further their growth. The
nature (no doubt) hath relation to Salt, which is a great help to Fer-
tility.

It hath been practised to cut off the Stalks of Cucumbers, immediately
after their bearing close by the Earth; and then to call a pretty quantity of
Earth upon the Plant that remaineth, and they will bear the next year Fruit
long before the ordinary time. The cause may be, for that the Sap goeth
down the sooner, and is not spent in the Stalk or Leaf, which remaineth
after the Fruit. Where note, that the Dying in the Winter, of the Roots or
Plants that are Annual, seemeth to be partly caused by the over-expence of
the Sap into Stalk and Leaves; which being prevented, they will super annu-
ate, if they stand warm.

The pulling off many of the Blossoms from a Fruit-tree, doth make the
Fruit fatter. The cause is manifest, for that the Sap hath the less to nourish.
And it is a common experience, That if you do not pull off some Blossoms,
the first time a Tree bloometh, it will blossom it self to death.

It were good to try what would be the effect, if all the Blossoms were
pulled from a Fruit-tree, or the Acorns and Chestnut-buds, &c. from a wilde
Tree, for two years together. I suppose, that the Tree will either put forth
the third year bigger, and more plentiful Fruit; or else, the same years, larger
Leaves, because of the Sap stored up.
It hath been generally received, that a Plant watered with warm Water, will come up sooner and better, than with cold Water, or with Showers. But the Experiment of watering Wheat with warm Water (as hath been said) succeeded not; which may be, because the trial was too late in the Year, &c. in the end of October. For the Cold then coming upon the Seed, after it was made more tender by the warm Water, might check it.

There is no doubt, but that Grafting (for the most part) doth meliorate the Fruit. The cause is manifest, for that the nourishment is better prepared in the Stock, than in the Crude Earth: But yet note well, that there be some Trees that are laid to come up more happily from the Kernel, than from the Graft; as the Peach, and Melocotone. The cause, I suppose to be, for that those Plants require a nourishment of great moistu re; and though the nourishment of the Stock be finer, and better prepared, yet it is not so moist and plentiful, as the nourishment of the Earth. And indeed we see those Fruits are very cold Fruits in their Nature.

It hath been received, that a smaller Pear grafted upon a Stock that beareth a greater Pear, will become great. But I think it is as true, as that of the Prime-Fruit upon the late Stock, and a Controversy, which we rejected before; for the Cions will govern. Nevertheless, it is probable enough, that if you can get a Cions to grow upon a Stock of another kinde, that is much moister than his own Stock, it may make the Fruit greater, because it will yield more plentiful nourishment, though it is like it will make the Fruit bafer. But generally the grafting is upon a dryer Stocks; as the Apple upon a Grab, the Pear upon a Thorn, &c. Yet it is reported, that in the Low-Countries they will graft an Apple-Cions upon the Stock of a Colewort, and it will bear a great flaggy Apple; the Kernel of which, if it be left, will be a Colewort, and not an Apple. It were good to try, whether an Apple-Cions will prosper, if it be grafted upon a Sallow or upon a Poplar, or upon an Alder, or upon an Elm, or upon an Horse-Plum, which are the moister of Trees. I have heard that it hath been tried upon an Elm, and succeeded.

It is manifest by experience, That Flowers removed, wax greater, because the nourishment is more easily come by in the loose Earth. It may be, that oft regrafting of the same Cions, may likewise make Fruit greater; as if you take a Cions, and graft it upon a Stock the first year; and then cut it off, and graft it upon another Stock the second year, and so for a third, or fourth year, and then let it, it will yield afterward, when it beareth, the greater Fruit.

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

It maketh Figs better, if a Fig-tree, when it beginneth to put forth Leaves, have his top cut off. The cause is plain, for that the Sap hath the leaves to feed, and the left way to mount; But it may be the Fig will come somewhat later, as was formerly touched. The same may be tried likewise in other Trees.

It is reported, That Mulberries will be fairer, and the Tree more fruitful, if you bore the Trunk of the Tree thorow in several places, and thrust into the places bored, Wedges of some hot Trees; as Taratine, Mastick-tree, Guaiacum, Juniper, &c. The cause may be, for that Adventive heat doth cheer up the Native Juice of the Tree.

It is reported, That Trees will grow greater and bear better Fruit, if you put Salt, or Lees of Wine, or Blood to the Root. The cause may be the creasing
creasing the Luft or Spirit of the Root: These things being more forcible than ordinary compotts.

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

Herbs will be tenderer, and faireer, if you take them out of Beds when they are newly come up, and remove them into Pots with better Earth. The remove from Bed to Bed was spoken of before; but that was in several years, this is upon the sudden. The cause is the same with other removes, formerly mentioned.

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

It is reported, That Cucumbers will prove more tender and dainty, if their Seeds be steeped (little) in Milk: the cause may be, for that the Seed being mollified with the Milk, will be too weak to draw the groffer Juyc of the Earth, but only the finer. The same Experiment may be made in Artichoaks, and other Seeds; when you would take away, either their Flashines or Bitternes. They speak also, that the like effect followeth of steeping in Water mixed with Honey; but that seemeth to me not so probable, because Honey hath too quick a Spirit.

It is reported, That Cucumbers will be less Watry, and more Melonlike, if in the Pit where you set them, you fill it (half way up) with Chaff, or small Sticks, and then power Earth upon them; for Cucumbers, as it seemeth, do extremly affect moisture, and over-drink themselves: which this Chaff, or Chips forbiddeth. Nay it is further reported, That if when a Cucumber is grown, you set a Pot of water about five or six inches distance from it, it will in Four and twenty hours shoot so much out as to touch the Pot; which if it be true, it is an Experiment of an higher nature than belongeth to this title: For it discovereth Perception in Plants to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the Vine is far more strange: It is, that if you set a stake, or prop, some distance from it, it will grow that way, which is far stranger (as is said) than the other: For that Water may work by a Sympathy of Attraction: But this of the Stake seemeth to be a reasonable discoure.

It hath been touched before, that Terebration of Trees doth make them prosper better. But it is found also, that it maketh the Fruit sweeter, and better. The cause is, for that not withstanding the Terebration, they may receive Aliment sufficient, and yet no more than they can well turn, and digest; and withal do sweat out the coursest and unhappiest Juice, even as it is in Living Creatures; which, by moderate feeding, and exercize, and sweat, attain the foundest habit of Body.

As Terebration doth meliorate fruit, so, upon the like reason, doth Letting of Plants Blood: as Pricking Vines, or other Trees, after they be of some growth, and thereby letting forth Gum or Tears, though this be noto continue, as it is in Terebration, but at some Seacons. And it is reported, that by this artifice, Bitter Almonds have been turned into sweet.

The Ancients for the Dulcorating of Fruit, do commend Swines dung above all other Dung, which may be, because of the moisture of that Beast, whereby the Excercyme hath less Acrimony; for we see Swines and Pigs Flesh is the moistest of fleshes.
It is observed by some, that all Herbs wax sweeter, both in smell and taste, if after they be grown up some reasonable time, they be cut, and so you take the latter Sprout. The cause may be, for that the longer the Juice floweth in the Root and Stalk, the better it concocteth. For one of the chief causes, why Grains, Seeds, and Fruits, are more nourishing than Leaves, is the length of time, in which they grow to Maturation. It were not amiss to keep back the Sap of Herbs, or the like, by some fit means till the end of Summer, whereby (it maybe) they will be more nourishing.

As Grafting doth generally advance and Meliorate Fruits, above that which they would be, if they were set of Kernels or Stones, in regard the nourishment is better concocted. So (no doubt) even in Grafting, for the same cause the choice of the Stock doth much; always provided, that it be somewhat inferior to the Gions. For otherwise it dulleth it. They commend much the Grafting of Pears, or Apples, upon a Quince.

Besides the Means of Melioration of Fruits before-mentioned, it is set down as tried, that a mixture of Bran and Swines Dung or Chaff and Swines-Dung (especially laid up together for a month to rot) is a very great nourisher and comforter to a Fruit-tree.

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

It is delivered by some, that if one take the Bough of a low Fruit-tree, newly budded, and draw it gently, without hurting it, into an Earthen pot perforate at the bottom, to let in the Plant, and then cover the Pot with Earth, it will yield a very large Fruit within the Ground. Which Experiment is nothing but potting of Plants, without removing and leaving the Fruit in the Earth. The like (they say) will be effected by an empty Pot without Earth in it, put over a Fruit, being propped up with a Stake as it hangeth upon the Tree, and the better, if some few Perturbations be made in the Pot. Wherein, besides the detending of the Fruit from extremity of Sun or Weather, some give a reason, that the Fruit loving and covering the open Air and Sun, is invited by the Perturbations to spread and approach as near the open Air as it can, and to inlargeth in Magnitude.

All Trees in high and Sandy Grounds, are to be set deep; and in Warty Grounds more shallow. And in all Trees when they be removed (especially Fruit-trees) care ought to be taken, that the sides of the Trees be coated, (North and South, &c.) as they stood before. The fame is laid also of Stone out of the Quarry, to make it more durable, though that seemeth to have left reason; because the Stone lieth not so near the Sun, as the Tree groweth.

Timber Trees in a Coppice wood, do grow better than in an open Field; both, because they offer not copred so much, but shoot up still in height, and chiefly, because they are defended from too much Sun and Wind, which do check the growth of all Fruits; and so (no doubt) Fruit-trees, or Vines, set upon a Wall, against the Sun, between Elbows and Buttrill of Stone, ripen more than upon a plain Wall.

It is said, that if Potato Roots be set in a Pot filled with Earth, and then the Pot with Earth be set likewise within the Ground, some two or three inches, the Roots will grow greater than ordinary. The cause may be, that having Earth enough within the Pot to nourish them; and then being stopped by the bottom of the Pot from putting strings downward, they must needs grow greater in breadth and thickness, and it may be that
that all Seeds, Roots, potted, and so set into the Earth, will prosper the better.

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

It is an Experiment of great pleasure to make the Leaves of Shaddy Trees, larger than ordinary. It hath been tried (for certain) that a Cions of a Weech Elm, grafted upon the stock of an ordinary Elm will put forth Leaves, almost as broad as the brim of one's Hat. And it is very likely, that as in Fruit-Trees, the Graft maketh a greater Fruit; so in Trees that bear no Fruit, it will make the greater Leaves. It would be tried therefore in Trees of that kind chiefly; as Birch, Ash, Willow, and especially the Shining Willow, which they call Swallow-Tail, because of the pleasure of the Leaf.

The Barrenness of Trees by accident (besides the weakness of the Soil Seed, or Root, and the injury of the Weather) coming either of their overgrowing with Mofs, or their being hide bound, or their planting too deep, or by influx of the Sap too much into the Leaves: For all these three are remedies mentioned before.

We see that in Living Creatures that have Male and Female, there is copulation of several kinds, and so Compound Creatures; as the Male, that is generated betwixt the Horse and Ass; and some other Compounds which we call Monsters, though more rare: And it is held, that that Proverb, Africa semper aliquid Monstri parit, cometh, for that the Fountains of Waters there being rare, divers sorts of Beasts come from several parts to drink, and so being refreshed fall to couple, and many times with several kinds. The compounding or mixture of Kindes in Plants is not found out; which nevertheless, if it be possible is more at command than that of Living Creatures, for that their lust requirith a voluntary motion; wherefore it were one of the most notable Experiments touching Plants, to finde it out, for so you may have great variety of new Fruits, and flowers yet unknown. Grafting doth it not, that mendeth the Fruit, or doubleth the Flowers, &c. But it hath not the power to make a new Kind. For the Cions ever over-ruleth the Stock.

It hath been set down by one of the Ancient. That if you take two Twigs of several Fruit Trees, and set them on the sides, and then bind them close together, and set them in the ground, they will come up in one Stock; but yet they will put forth in their several Fruits without any commixture in the Fruit. Wherein note (by the way) that Unity of Continuance, is easier to procure, than Unity of Species. It is reported also, That Vines of Red and White Grapes, being set in the Ground, and the upper parts being flatted, and bound close together, will put forth Grapes of the several colours, upon the same Branch; and Grapes stones of several colours within the same Grape: But the more, after a year or two, the unity (as it seemeth) growing more perfect. And this will likewise help, if from the
the first uniting, they be often watered; for all moisture helpeth to Union. And it is prescribed also to bind the Bud, as soon as it come thence forth, as well as the Stock, at the least for a time.

They report, that divers seeds put into a Clout, and laid in Earth well dugged, will put up Plants contiguous; which (afterwards) being bound in, their Shoots will incorporate. The like is said of Kernels put into a Bottle, with a narrow mouth, filled with Earth.

It is reported, that young Trees of several kinds let contiguous without any binding, and very often watered in a fruitful ground, with the very luxury of the Trees, will incorporate and grow together. Which seemeth to me the likeliest means that hath been propounded; for that the binding doth hinder the natural swelling of the Tree, which, while it is in motion, doth better unite.

There are many ancient and received Traditions and Observations, touching the Sympathy and Antipathy of Plants; for that some will thrive best growing near others, which they impute to Sympathy; and some worse which they impute to Antipathy. But there are idle and ignorant conceits, and forsake the true indication of the causes; as the mott part of Experiments, that concern Sympathies and Antipathies do. 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 utterly mistaken; for their Sympathy is an Antipathy, and their Antipathy is a Sympathy: For it is thus, whatsoever one Plant draweth such a particular Juice out of the Earth, as it qualifieth the Earth, so as that Juice which remaineth is fit for the other Plant, there the Neighborhood doth good, because the nourishment are contrary, or several: But where two Plants draw (much) the same Juice, there the Neighborhood hurteth; for the one deceiveth the other.

First, therefore, all Plants that do draw much nourishment from the Earth, and so soak the Earth, and exhaust it, hurt all things that grow by them; as great Trees, (especially Ashes) and such Trees, as spread their Roots near the top of the ground. So the Colewort is not an enemy (though that were anciently received) to the Vine onely; but it is an enemy to any other Plant; because it draweth strongly the fatterst Juice of the Earth: And if it be true, that the Vine, when it creepeth near the Colewort, will turn away: This may be, because there it findeth worse nourishment; for though the Root be where it was, yet (I doubt) the Plant will bend as it nouriseth.

Where Plants are of several Natures, and draw several Juices out of the Earth, there (as hath been said) the one get by the other helpeth; As it is set down by divers of the Ancients, that Rose doth prosper much, and become stronger, if it be set by a Fig-Tree: Which (we conceive) is caused not by reason of Friendship, but by Extraction of contrary Juices; the one drawing Juice fit to relish the other bitter. So they have set down likewise, that a Rose set by Garlic is sweeter; which likewise may be, because the more Fetidie Juice of the Earth goeth into the Garlic, and the more odorate into the Rose.

This we see manifestly, That there be certain Corn-Flowers which come seldom or never in other places, unless they be set, but only amongst K 3 Corn.
Corn: As the blew Bottle a kinde of yellow Mary-Gold, Wilde Poppye, and Fumitory. Neither can this be by reason of the culture of the Ground, by Ploughing or Furrowing, as some Herbs and Flowers will grow but in Ditches new cast, for if the ground yee fallow and undown, they will not come: So as it should seem to be the Corn that qualifieth the Earth, and prepareth it for their growth.

This observation if it holdeth (as it is very probable) is of great use, for the modifying of taste in Fruits, and Esculent Herbs, and of the sent of Flowers. For I do not doubt, but if the Fig-tree do make the Rews more strong and bitter, (as the Ancients have noted) good store of Rews planted about the Fig-tree, will make the Fig more sweet. Now the tastes that do moit offend in Fruits, and Herbs, and Roots, are bitter, harsh, sour, and watrinish, or thaly. It were good therefore to make the Tryals following.

Take Wormwood or Rew, and let it near Lettuce, or Coleflory, or Artrichoak; and see whether the Lettuce, or the Coleflory, &c. become not the sweeter.

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

Take Cucumbers or Pumpions, and set them (here and there) amongst Musk-Melons, and see whether the Melons will not be more winy, and better tafted. Set Cucumbers (likewise) amongst Raddish, and see whether the Raddish will not be made the more biting.

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

Take Common Bryar, and set it amongst Violets or Wall-flowers, and see whether it will not make the Violets or Wall-flowers sweeter, and less earthy in their smell. So set Lettuce or Cucumbers, amongst Rosemary or Bays, and see whether the Rosemary or Bays, will not be the more oderate or aromatical.

Contrariwise, you must take heed how you set Herbs together that draw much the like Juice. And therefore I think Rosemary will leese in sweetness, if it be set with Lavender or Bays, or the like. But yee, if you will correct the strength of an Herb, you shall do well to set other like Herbs by him, to take him down; and if you would set Tanley by Angelica, it may be the Angelica would be the weaker and little for mixture in perfume. And if you should set Rew by Common Wormwood, it may be, the Wormwood would turn to be like Roman Wormwood.

This Axiom is of large extent; and therefore would be severed, and refined by Tryal. Neither must you expect to have a gross difference by this kinde of Culture, but onely further Perfection.

Tryal would be also made in Herbs, Poisionous, and Purgative, whose ill quality (perhaps) may be discharged or attempted, by setting stronger Poylons or Purgatives by them.

It is reported, That the Shrub called Our Ladies Seal, (which is a kinde of Briony) and Coleworts, set near together, one or both will die. The cause is, that they be both great Depredators of the Earth, and one of them starveth the other. The like is said of Reed, and a Brake, both which are succulent, and therefore the one deceiveth the other. And the like of Hemlock and Rew, both which draw strong Juices.

Some of the Ancients, and likewise divers of the Modern Writers, that have labored in Natural Magick, have noted a Sympathy between the Sun, Moon,
Moon, and some principal Stars, and certain Herbs, and Plants. And so
they have denominated some Herbs Solar, and some Lunar, and such like
toys put into great words. It is manifest, that there are some Flowers
that have respect to the Sun in two kinds: the one by opening and fluttering,
and the other by bowing and inclining the Head. For Mary-golds, Tulip-pearls,
and indeed most flowers do open or spread their leaves abroad, when
the Sun shineth serene and fair: And again, (in some part) close them, or
gather them inward, either toward night, or when the Sky is overcast. Of
this, there needeth no such solemn reason to be assigned, as to say, That they
rejoice at the presence of the Sun, and mourn at the absence thereof. For
it is nothing else, but a little loading of the leaves, and swelling them at the
bottom, with the moisture of the air; whereas the dry air doth extend them.
And they make a piece of the wonder, That Garden-Claver will hide the
stalk, when the Sun beareth bright, which is nothing but a full expansion
of the leaves; for the bowing and inclining the head, it is found in the
great flower of the Sun, in Mary-golds, Wartwort, 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 sun beareth, waxeth
more faint and flaccide in the stalk, and thereby les able to support the
flower.

What a little moisture will do in vegetables, even though they be dead,
and fevered from the earth, appeareth well in the experiment of juglers.
They take the beard of an oat, which (if you mark it well) is wreathed at
the bottom, and one smooth entire straw at the top. They take only the
part that is wreathed, and cut off the other, leaving the beard half the
breath of a finger in length. Then they make a little cros of a quill long-
ways, of that part of the quill which hath the pith; and cros-ways of
that piece of the quill without pith, the whole cros being the breadth of a
finger high: Then they prick the bottom where the pith is, and thereinto
they put the open-beard, leaving half of it sticking forth of the quill: Then
they take a little white box of wood to deceive men, as if somewhat in the
box did work the feat; in which, with a pin, they make a little hole, enough
to take beard, but not to let the cros sink down, but to flick: Then like-
wise, by way of imposition, they make a question: As, who is the fairest
woman in the company? or who hath a glove or card? and cause an-
other to name divers persons; and upon every naming, they flick the crofs
in the box, having first put it towards their mouth, as if they charmed it,
and the cros flieteth not: But when they come to the person that they
would take, as they hold the cros to their mouth, they touch the beard
with the tip of their tongue, and wet it, and so flick the cros in the box,
and then you shall see it turn finely and softly, three or four turns, which
is caused by the untwining of the beard by the moisture. You may see it
more evidently if you flick the cros between your fingers, instead of the
box: And therefore 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 Mary-
gold.

It is reported by some, that the herb called Rosata (whereof they
make strong waters) will at the noon-day, when the sun shineth hot and
bright, have a great dew upon it. And therefore, that the right name is
Ros Solor; which they impute to a delight and sympathy that is hath with
the sun. Men favor wonders. It were good first to be sincere, that the
dew that is found upon it, be not the dew of the morning preserved,
when the Dew of other Herbs is breathed away: For it hath a smooth and thick Leaf that doth not discharge the Dew so soon as other Herbs, that are more Spungy and Porous. And it may be further, or some other Herb doth the like, and is not marked. But if it be so, that it hath more Dew at Noon than in the Morning, then sure it leemeth to be an exudation of the Herb it self. As Plums sweat when they are set into the Oven: For you will not (I hope) think, that it is like Gideon's Fleece of Wooll, that the Dew should fall upon that, and no where else.

It is certain, that the Honey-dews are found more upon Oak Leaues, than upon Ash, or Beech, or the like: But whether any caufe be from the Leaf it self, to concoct the Dew; or whether it be only, that the Leaf is close and smooth (and therefore drinketh not in the Dew, but preferveth it) may be doubted. It would be well inquired, whether Mauna the Drug, doth fall but upon certain Herbs or Leaues only. Flowers that have deep Sackets do gather in the bottom, a kind of Honey; as Honeysuckles (both the Woodbine, and the Trifoil) Lillies, and the like. And in them certainly the Flower beareth part with the Dew.

The Experience is, That the Froth, which they call Woodfare, (being like a kinde of Spittle) is found but upon certain Herbs, and those hot ones; as Lavender, Lavender-cotton, Sage, Hysop, &c. Of the caufe of this enquire further, for it leemeth a secret. There falledh alfo Midew upon Corn, and fmullceth it: But it may be, that the same falledh alfo upon other Herbs, and is not observed.

It were good, Tryal were made, whether the great consent between Plants and Water, which is a principal nourishment of them, will make an Attraction or Diftance, and not at touch onely. Therefore take a Vevell, and in the middle of it make a falle bottom of course Canvas; fill it with Earth above the Canvas, and let not the Earth be waterd, then fow fome good Seeds in that Earth: But under the Canvas, fome half a foot in the bottom of the Vevell, lay a great Spunge, thorowly wet in Water, and let it lie fome ten days; and fee whether the Seeds will fprout, and the Earth become more moif, and the Spunge more dry. The Experiment formerly mentioned of the Cucumber, creeping to the Pot of Water, is far stranger than this.

The altering of the Sent, Colour, or Taff of Fruit, by Infusing, Mixing, or Letting into the Bark, or Root of the Tree, Herb, or Flower, any Coloured, Aromatical, or Medicinal Substance, are but fancies. The caufe is, for that those things have past their period, and nourith not; and all alteration of Vegetables, in those qualities, must be by fome what that is apt to go into the nourishment of the Plant. But this is true, that where Kine feed upon Wilde Garlick, their Milk taffed plainly of the Garlick. And the Flefh of Muttons is better taffed where the Sheep feed upon Wilde Thyme, and other wholesome Herbs. Galen alfo fpeaketh of the curing of the Scirrhus of the Liver, by Milk of a Cow, that feedeth upon certain Herbs; and Honey in Spain smelleth (apparently) of the Rosemary, or Orange, from whence the Bee gather it: And there is an old Tradition of a Maiden that was fed with Napolises, (which is counted the strongest Poyson of all Vegetables) which with use, did not hurt the Maid, but poysoned some that had carnal company with her. So it is observed by some, that there is a vertuous Bezoar, and another without vertue, which appear to the fiew alike; but the vertuous is taken from the Beall, that feedeth upon the Mountains, where there
there are Theriacel Herbs; and that without vertue, from those that fed in the Valleys, where no such Herbs are. Thus far I am of opinion, that as steeped Wines and Beers are very Medicinal, and likewise Bread tempered with divers powders; too of Meat also, (as Flesh, Fish, Milk, and Eggs) that they may be made of great use for Medicine and Diet, if the Beasts, Fowls, or Fish, be fed with a special kind of food, fit for the diseases. It were a dangerous thing also for secret empoyonments. But whether it may be applied unto Plants, and Herbs, I doubt more, because the nourishment of them is a more common juice; which is hardly capable of any special quality until the Plant do assimilate it.

But lest our incredulity may prejudice any profitable operations in this kind (especially since many of the Ancients have set them down) we think good briefly to propound the four Means, which they have devised of making Plants Medicinal. The first is by slitting of the Root, and infusing into it the Medicine, as Hellebore, Opium, Scammony, Triacle, &c. and then binding it up again. This seemeth to me the least probable, because the Root draweth immediately from the Earth, and to the nourishment is the more common and less qualified; and besides, it is a long time in going up, ere it come to the Fruit. The second way is, to perforate the Body of the Tree, and there to infuse the Medicine, it hath the least way, and the least time to go up. The third is, the steeping of the Seed or Kernel in some Liquor wherein the Medicine is infused, which I have little opinion of, because the Seed (I doubt) will not draw the parts of the matter which have the propriety; but it will be far the more likely, if you mingle the Medicine with Dung, for that the Seed, naturally drawing the moisture of the Dung, may call in withal some of the propriety. The fourth is, the Watering of the Plant oft, with an infusion of the Medicine. This, in one respect may have more force than the rest, because the Medication is oft renewed, whereas the rest are applied, but at one time; and therefore the vertue may the sooner vanish. But still I doubt, that the Root is somewhat too stubborn to receive those fine Impressions; and besides (as I have said before) they have a great Hill to go up. I judge therefore the likeliest way to be the perforation of the Body of the Tree, in several places, one above the other; and the filling of the Holes with Dung mingled with the Medicine. And the Watering of those Lumps of Dung, with Squirts of an Infusion of the Medicine in dunged Water once in three or four days.
Ur Experiments we take care to be (as we have often said,) either *Experiments Fructuera*, or *Lucifera*; either of Ufe, or of Discovery: For we hate Impostsures, and despife Curiosities. Yet because we must apply ourselves somewhat to others, we will let down some Curiosities touching Plants.

It is a Curiosity to have several Fruits upon one Tree; and the more, when some of them come early, and some come late: So that you may have, upon the same Tree, ripe Fruits all Summer. This is easily done by Grafting of several Clones upon several Boughs of a Stock, in a good ground, plentifully fed. So you may have all kindes of Cherries, and all kindes of Plumbs, and Peaches, and Apricots upon one Tree: But, I conceive the Diversity of Fruits must be such, as will graft upon the same Stock. And therefore, I doubt, whether you can have Apples, or Pears, or Oranges, upon the same Stock, upon which you graft Plumbs.

It is a Curiosity to have Fruits of divers Shapes and Figures. Th'is is easily performed by Moulding them, when the Fruit is young, with Moulds of Earth or Wood. So you may have Cucumbers, &c. as long as a Cane, or as round as a Sphere, or formed like a Cross. You may have also Apples in the form of Pears or Lemmons. You may have also Fruit in more accurate Figures; as we said of Men, Beasts, or Birds, according as you make the Moulds, wherein you must understand, that you make the Mould big enough to contain the whole Fruit, when it is grown to the greatest; for else you will choak the spreading of the Fruit, which otherwise would spread itself, and fill the Concave, and so be turned into the shape desired; as it is in Mould-works of Liquid things. Some doubt may be conceived,
Natural History;

ceived, that the keeping of the Sun from the Fruit, may hurt it: But there
is ordinary experience of Fruit that groweth covered. Quare also, whether
some small holes may not be made in the Wood, to let in the Sun. 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.

It is a curiosity to have Inscriptions or Engravings, in Fruit or Trees. This
is easily performed, by writing with a Needle, or Bodkin, or Knife, or the like,
when the Fruit or Trees are young; for as they grow, so the Letters will
grow more large, and graphical.

-Tenebrisque meos incidere Amores
  Arboribus, crescentis ille, crescentis Amores.

You may have Trees apparelled with Flowers or Herbs by boring holes
in the Bodies of them, and putting into them Earth holpen with Muck, and
setting Seeds or Slips, of Violets, Strawberries, Wilder Time, Camomile, and such
like in the Earth, wherein they do but grow in the Tree, as they do in Pots,
though (perhaps) with some feeding from the Trees. As it would be tryed
also with Shoots of Pines, and Roots of Red-Roses; for it may be, they being
of a more Ligneous Nature, will incorporate with the Trees it self.

It is an ordinary curiosity to form Trees and Shrubs (as Rosemary, Juniper,
and the like) into sundry shapes; which is done by moulding them
within, and cutting them without. But they are but some things, being
too small to keep Figure; great Castles made of Trees upon Frames of
Timber, with Turrets and Arches, were anciently matters of magnifi-
cence.

Amongst curiosities, I shall place Colouration, though it be somewhat
better, for Beauty in Flowers is their pre-eminence. It is observed by some,
that Gilly-Flowers, Sweet-Williams, Violets, that are coloured, if they be neg-
lected, and neither Watered, nor new Moulded, nor Transplanted, will
turn White. And it is probable, that the White, with much culture, may
turn coloured; for this is certain, that the white colour cometh of scarcity
of Nourishment; except in Flowers that are only white, and admit no
other colours.

It is good therefore to see what Natures do accompany what colours;
for by, that you shall have light, how to induce colours, by producing
those Natures. Whites are more inodorate (for the most part) than Flowers
of the same kind coloured; as is found in single White Violets, White
Roses, White Gilly-Flowers, White Stock-Gilly-Flowers, &c. We finde al-
do, that Blossoms of Trees that are White, are commonly inodorate; as
Cherries, Pears, Plums, whereas those of Apples, Crabs, Almonds, and
Peaches, are blathy, and smell sweet. The cause is, for that the substance
that maketh the Flower, is of the thinnest and finceft of the Plant; which also
maketh Flowers to be of so dainty Colours. And if it be too sparing and
thin, it attains no strength of odor, except it be in such Plants as are
very succulent; whereby they need rather to be fcented in their nourish-
ment, than replenished, to have them sweet. As we see in White Seryton,
which is of a dainty smell; and in Bean-flowers, &c. And again, if the
Plant be of Nature to put forth White Flowers onely, and those not thin or
dry, they are commonly of rank and fullsome smell; as May-Flowers and
White Lillies.

Contrariwise, in Berries, the White is commonly more delicate and
sweet in taste, than the Coloured; as we see in white Grapes, in white
Ralphs, in white Strawberries, in white Currans, &c. The caufe is for that
the
the coloured are more juyced, and so is the white, but the white is better proportioned to the digestion of the Plant.

But in Fruits, the white commonly is meaner, as in Pear-Plums, Damason, &c. and the choicest Plumbs are black; the Mulberry, (which though they call it a Berry, is a Fruit) is better the Black, than the White. The Harvest White-Plumb, is a base Plumb, and the Persicaria and White Date-Plumb, are no very good Plumbs. The cause is, for that they are all over-watry: Whereas an higher Concoction is required for sweetness or pleasure of taste; and therefore all your dainty Plumbs, are a little dry, and come from the Stone; as the Muckle-Plumb, the Damason-Plumb, the Peach, the Apricot, &c. Yet some Fruits which grow not to be Black, are of the Nature of Berries, sweetest such as are paler, as the Ceur-Cherry, which inclineth more to White, is sweeter than the Red; but the Egriot is more sour.

Take Gilliflower Seed, of one kind of Gilliflower (as of the Clare-Gilliflower which is the most common) and sow it, and there will come up Gilliflower, some of one colour, and some of another, casually, as the Seed meeteth with nourishment in the Earth: So that the Gardiners finde, that they may have two or three Roots amongst an hundred that are rare, and of great price, as Purple Carnation of severall Stripes. The cause is (no doubt) that in Earth, thought it be contiguous, and in one Bed there are very several Juices, and as the Seed doth casually meeteth with them, so it cometh forth. And it is noted especially, that thofe which do come up Purple, do always come up Single; the Juice, as it cometh, not being able to fulcet a succulent-colour, and a double Leaf. This Experiment of severall colours, coming up from one Seed, would be tried also in Larks-foot, Monk-hood, Poppy, and Hollyhock.

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

The general colour of Piums is Green, which is a colour that no Flower is of. There is a greenith Prime-Rose, but it is pale, and scarce a green; the Leaves of some Trees turn a little Murrey or Reddish, and they are commonly young Leaves that do so; as it is in Oaks and Vines. And Holly-Leaves rot into a Yellow; and some Hollies had part of their Leaves Yellow, that are (to all seeming) as fresh and shining as the Green. I suppose also, that Yellow is a less succulent colour than Green, and a degree nearer White. For it hath been noted, that those Yellow Leaves of Holly, stand ever toward the North or North-East. Some Root are Yellow, as Carrot; and some Plants, Blood-red, Stalk and Leaf, and all; as Amaranthus. Some Herbs incline to Purple and Red; as a kind of Sage doth; and a kind of Mint, and Rosa Salsa, &c. And some have White Leaves, as another kind of Sage, and another kind of Mint: But Azure and a taine Purple are never found in Leaves. This sheweth, that Flowers are made of a refined Juice of the Earth, and so are Fruits, but Leaves of a more coarse and common.

It is a curiosity also to make Flowers double, which is effected by often removing them into new Earth; as on the contrary part, double Flowers, L. 109

Century VI.
by neglecting, and not removing, prove single. And the way to do it speedily, is to low or set Seeds, or Slips of Flowers; and as soon as they come up, to remove them into new ground that is good: Enquire also, whether inoculating of Flowers, (as Stock-Gilliflowers, Roses, Musk-Roses, &c.) doth not make them double. There is a Cherry-Tree that hath double Blossoms, but that Tree beareth no Fruit; and, it may be, that the same means which applied to the Tree, doth extremely accelerate the Sap to rise and break forth, would make the Tree spend itself in Flowers, and those to become double; which were a great pleasure to see, especially in Apple-trees, Peach-trees, and Almond-trees, that have Blossoms Blush coloured.

The making of Fruits without Core or Stone, is likewise a curiosity, and somewhat better; because whatsoever makes them fo, is like to make them more tender and delicate. If a Cions or Shoot fit to be set in the Ground, have the Pith finely taken forth (and not altogether, but some of it left, the better to save the life,) it will bear a Fruit with little or no Core or Stone, and the like is said to be of dividing a quick Tree down to the Ground, and taking out the Pith, and then binding it up again.

It is reported also, that a Citron grafted upon a Quince will have small or no Seeds: and it is very probable, that any fower Fruit grafted upon a Stock that beareth no Fruit, may both make the Fruit sweeter, and more void of the harsh matter of Kernels or Seeds.

It is reported, that not only the taking out of the Pith, but the stopping of the Juice of the Pith from rising in the midst, and turning it to rise on the outside, will make the Fruit without Core or Stone; as if you should bore a Tree clean thorough, and put a wedge in. It is true, there is some affinity between the Pith and the Kernel, because they are both of a harsh substance, and both placed in the midst.

It is reported, that Trees watered perpetually with warm Water, will make a Fruit with little or no Core or Stone. And the rule is general, That whatsoever will make a wilde Tree, a Garden Tree, will make a Garden Tree to have less Core or Stone.

The Rule is certain, That Plants for want of Culture, degenerate to be barker in the same kind, and sometimes so far, as to change into another kind: 1. The standing long, and not being removed, maketh them degenerate. 2. Drought, unless the Earth of itself be moist, doth the like. 3. So doth removing into worse Earth, or forbearing to compost the Earth; as we see, that Water-Mint turneth into Field Mint, and the Colewort into Rape by neglect, &c.

Whatsoever Fruit ufed to be set upon a Root, or a Slip, if it be sown, will degenerate; Grapes sown, Figs, Almonds, Pomegranate Kernels sown, make the Fruits degenerate, and become wilde. And again, most of those Fruits that use to be grafted, if they be set of Kernels, or Stones degenerate. It is true, that Peaches (as hath been touched before) do better upon Stones set, than upon grafting: And the rule of Exception should seem to this, That whatsoever Plant requireth much moisture, prospereth better upon the Stone or Kernel, than upon the Graft. For the Stock, though it give a finer nourishment, yet it giveth a fatter, than the Earth at large.

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

them in Water gently boiled; and if they be good, they will sprout within half an hour.

It is strange which is reported, That Basil too much exposed to the Sun, doth turn into Wilde Time: Although those two Herbs seem to have small Affinity; but Basil is almost the only hot Herb that hath fat and succulent Leaves; which Oylines if it be drawn forth by the Sun, it is like it will make a very great change.

There is an old Tradition, that Boughs of Oak put into the Earth, will put forth Wilde Vines; which if it be true, (no doubt) it is not the Oak that turneth into a Vine, but the Oak-bough purifying, qualifieth the Earth to put forth a Vine of it self.

It is not impossible, and I have heard it verified, that upon cutting down of an old Timber-tree, the Stub hath put out sometimes a Tree of another kinde; as that Beech hath put forth Birch: Which if it be true, the cause may be, for that the old Stub is too scant of Juice to put forth the former Tree; and therefore puttheth forth a Tree of smaller kinde, that needeth les Nourishment.

There is an opinion in the Countrey, That if the same Ground be off sown with the Grain that grew upon it, it will, in the end, grow to be of a safer kinde.

It is certain, that in Sterile Years, Corn sown will grow to an other kinde.

Granda sep pe quibus mandavimus Hordea Sulci, Infaia Lusum, & steriles dominaturn Aveoa.

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

This work of the Transmutation of Plants, one into another, is inter Magnalia Nature: For the Transmigration of Species is, in the vulgar Philofohy, pronounced impossible: And certainly, it is a thing of difficulty, and requireth deep search into Nature: But seeing there appear some manifest instances of it, the opinion of impossibility is to be rejected, and the means thereof to be found out. We see that in Living Creatures, that come of Putrefaction, there is much Transmutation of one into another. As Cifterpillers turn into Flies, &c. And it should seem probable, that whatsoever Creature having 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 we may well conclude, that seeing the Earth of it self, doth put forth Plants without Seed; therefore Plants may well have a Transmigration of Species. Wherefore wanting Instances, which do occur, we shall give Directions of the most likely trials: And generally, we would not have those that read this work of Sylva Syldarum, account it strange, or think that it is an over-haste, that we have let down particulars untried: For contra-vice; in our own estimation, we account such particulars more worthy than those that are already tried and known. For these latter must be taken as you finde them, but the other do level point blank at the inventing of causes, and Axioms.
Natural History;

526. First, therefore you must make account, that if you will have one Plant change into another, you must have the Nourishment over-rule the Seed: And therefore you are to practice it by Nourishments as contrary as may be, to the Nature of the Herb; to nevertheless as the Herb may grow, and like wise with Seeds that are of the weakest sort, and have least vigor. You shall do well therefore to take Marsh Herbs, and plant them upon tops of Hills and Champaigns; and such Plants as require much moisture, upon Sandy and very dry grounds. As for example, Marsh-Mallows, and Sedge upon Hills, Cucumber and Lettuce Seeds, and Coleworts upon a Sandy Plat; to contrariwise plant Bushes, Heath, Ling, and Brakes upon a Wet or Marsh Ground. This I conceive also, that all Exscent and Garden Herbs, set upon the tops of Hills, will prove more Medicinal, though less Exscent, than they were before. And it may be likewise, some Wilde Herbs you may make Slaet Herbs. This is the first Rule for Transmutation of Plants.

527. The second Rule should be to bury some few Seeds of the Herb you would change amongst other Seeds; and then you shall see whether the Juice of those other Seeds do not so qualify the Earth, as it will alter the Seed whereupon you work. As for example, Put Parly-feed amongst Onion-feed, or Lettuce-feed amongst Parly-feed, or Basli-feed amongst Thyme-feed, and see the change of taste or otherwise. But you shall do well to put the Seed you would change into a little Linnen Cloth, that it mingle not with the Foreign Seed.

528. The third Rule shall be the making of some medly, or mixture of Earth, with some other Plants bruised, or shayed, either in Leaf or Root: As for example make Earth, with a mixture of Colewort Leaves flamped, and set in it Artichoaks, or Parinsips: So take Earth made with Majoram, or Oreganum, or Wilde Thyme, bruised, or flamped, and set in it Fenem-feed, &c. In which operation, the Process of Nature still will be, (as I conceive,) not that the Herb you work upon, should draw the Juice of the Foreign Herb: (for that opinion we have formerly rejected) but there will be a new confection of mould, which perhaps will alter the Seed, and yet not to the kinde of the former Herb.

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

530. The fifth Rule shall be, to make the Herb grow contrary to his nature, as to make Ground Herbs rise in height: As for example, Carri Camomile, or Wilde Thyme, or the Green Strawberry, upon Sticks, as you do Hops upon Poles, and see what the event will be.

531. The sixth Rule shall be to make Plants grow out of the Sun, or open Air; for that is a great mutation in Nature, and may induce a change in the Seed: As barrel up Earth, and sow some Seed in it, and put in the bottom of a Pond, or put it in some great hollow Tree; try also the sowing of
of Seeds in the bottoms of Caves; and Pots with Seeds pawn, hanged up in Wells, some distance from the Water, and see what the event will be.

It is certain, that Timber-Trees in Coppice Woods, grow more upright, and more free from under Boughs, than those that stand in the Fields. The cause whereof is, for that Plants have a natural motion to get to the Sun; and besides, they are not glutted with too much nourishment; for that the Coppice shareth with them, and Repletion ever hindereth stature. Lastly, they are kept warm, and that ever in Plants helpeth mounting.

Trees that are of themselves full of Heat, (which heat appeareth by their inflammable Gums) as Firs, and Pines, mount of themselves in height without Side-boughs, till they come towards the top. The cause is partly heat, and partly the nature of Firs; both which send the Sap upwards. As for Juniper, it is but a Shrub; and growth not big enough in Body to maintain a tall Tree.

It is reported, that a good strong Canvas, spread over a Tree grave- ed low, soon after it putteth forth, will dwarf it, and make it ipred. The cause is plain; for that all things that grow, will grow as they finde room.

Trees are generally set of Roots or Kernels; but if you let them of Slips, (as of some Trees you may, by name the Mulberry) some of the Slips will take; and those that take, (as is reported) will be Dwarf-trees. The cause is, for that a Slip draweth nourishment more weakly, than either a Root or Kernel.

All Plants that putteth their Sap hastily, have their Bodies not propor- tionable to their length, and therefore they are Winders and Creepers; as Iy, Briony, Hops, Woodbine: Whereas Dwarfing requireth a slow putting forth, and less vigor of mounting.

The Scripture faith, That Solomon wrote a Natural History, from the Cedar of Libanus, to the Moss growing upon the Wall; for so the best Translations have it. And it is true, that Moss is but the Rudiments of a Plant, and (as it were) the Mould of Earth or Bark.

Moss growth chiefly upon Ridges of Houses, tiled or thatched, and upon the Crests of Walls, and that Moss is of a lightsome and pleasant Green. The growing upon Slopes is caused for that Mosses, as on the one side it cometh of Moisture and Water, so on the other side the Water must but slide, and not stand or pool. And the growing upon Tilles, or Walls, &c. is caused, for that those dried Earths, having not moisture sufficient to putteth a Plant, do practice Germination by putting forth Mosses; though when by age, or otherwise, they grow to re- lent and resolve, they sometimes put forth Plants, as Wall-flowers. And almost all Moss hath here and there little Stalks, besides the low Thrum.

Moss growth upon Alleys, especially such as lie cold, and upon the North; as in divers Thames. And again, if they be much trodden; or if they were at the first gravelled: For wherefoever Plants are kept down, the Earth putteth forth Moss.
Natural History

539. Old Ground, that hath been long unbroken up, gathereth Mofs; and therefore Husbandmen use to cure their Pasture-Grounds, when they grow to Mofs, by Tilling them for a year, or two: Which also dependeth upon the same cause: for that the more sparing and starving Juyce of the Earth, insufficient for Plants, doth breed Mofs.

540. Old Trees are more Mollie, (far) than young; so that the Sap is not so frank as to rise all to the Boughs, but tireth by the way, and putteth out Mofs.

541. Fountains have Mofs growing upon the Ground about them;

Mueofa Fomes.—The cause is, for that the Fountains drain the Water from the Ground adjacent, and leave but sufficient moisture to breed Mofs; and besides, the coldness of the Water conducteth to the same.

542. The Mofs of Trees, is a kind of Hair; for it is the Juyce of the Tree, that is excreted, and doth not assimilate, and upon great Trees the Mofs gathereth a figure, like a Leaf.

543. The moisture for Trees yield little Mofs, as we see in Alts, Poplars, Willows, Beeches, &c. Which is partly caused for the reason that hath been given of the frank putting up of the Sap into the Boughs; and partly, for that the Barks of those Trees are more close and smooth, than those of Oaks, and Aldes, whereby the Mofs can the harder illice out.

In Clay Grounds, all Fruit Trees grow full of Mofs, both upon Body and Boughs; which is caused, partly by the coldness of the Ground, whereby the Plants nourish less; and partly by the roughness of the Earth, whereby the Sap is shut in, and cannot get up, to spread so frankly as it should do.

We have said heretofore, that if Trees be hide-bound, they wax less fruitful and gather Mofs; 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 Mofs: Which (I think) happeneth to Trees that stand bleak, and upon the cold Winds. It would also be tried, whether, if you cover a Tree, somewhat thick upon the top, after his powling, it will not gather more Mofs. I think also, the Watering of Trees with cold Fountain Water will make them grow full of Mofs.

545. There is a Mofs the Persifnume have, which cometh out of Apple-Trees, that hath an excellent scent. Query, particularly for the manner of the growth, and the nature of it. And for this Experiments fake, being a thing of price, I have set down the last Experiments, how to multiply and call on Moffs.

546. Next unto Mofs, I will speake of Mushromes, which are likewise an unperfect Plant. The Mushromes have two strange properties; the one, that they yield so delicious a Meat; the other, that they come up so hastily, as in a night; and yet they are unknown. And therefore such as are Upstarts in State, they call in reproach, Mushromes. It must needs be therefore, that they be made of much moisture; and that moisture fit, gros, and yet somewhat concocted. And (indeed) we finde, that Mushromes cause the acciden, which we call Incubus, or the Marse in the Stomach. And therefore the Surfeit of them may suffocare and empyson. And this fieweth, that they are windy; and that windiness is gros, and swelling, not sharp or gripping. And upon the same reason Mushromes are a veneous Meat.
It is reported, that the Bark of white or red Poplar, (which are of the moistest of Trees) cut small, and cast into Furrows well dunned, will cause the ground to put forth Muhromes, at all feasons of the year fit to be eaten, some add to the mixture Leaven of Bread, resolved in Water.

It is reported, that if a Hilly-field, where the stubble is standing, be set on fire, in the showry feason, it will put forth great store of Muhromes.

It is reported, that Harts-Horn shaken, or in small pieces, mixed with Dung, and wetted, puteth up Muhromes. And we know that Harts-Horn is of a fat and clammy substance: And it may be Ox-Horn would do the like.

It hath been reported, thought be scarce credible, that Ivy hath grown out of a Stags-Horn; which they suppose did rather come from a contaction of the Horn upon the Ivy, than from the Horn itself. There is not known any substance, but Earth, and the Procedents of Earth, (as Tile-Stone, &c.) that yieldeth any Moss, or Herby substance. There may be tryal made of some Seeds, as that Fennel-Seed, Mustard-Seed, and Rape-Seed, put into some little holes made in the Horns of Stags, or Oxen, to see if they will grow.

There is also another unperfect Plant, that (in show) is like a great Muhrome: And it is sometimes as broad as ones Har, which they call a Tennis-Ball; but it is not Efficient, and it growth (commonly) by a dead Stub of a Tree, and likewise about the Roots of rotten Trees; and therefore seemeth to take his Juice from Wood purfied. Which sheweth by the way, that Wood purfied yieldeth a frank moisture.

There is a Cake that growth upon the side of a dead Tree, that hath gotten no name, but it is large and of a Chefsnut colour, and hard and pithy; whereby it should seem, that even dead Trees forget not their putting forth, no more than the Carcasses of Mens Bodies that put forth Hair and Nails for a time.

There is a Cod or Bag that growth commonly in the Fields; that at first is hard like a Tennis-Ball, and white; and after growth of a Muhrome colour, and full of light dust upon the breaking; and is thought to be dangerous for the eyes, if the Powder get into them, and to be good for Kibes. Belike it hath a Corrofive, and fretting Nature.

There is an Herb called Jew-Bur, that growth upon the Roots, and lower parts of the Bodies of Trees, especially of Elders, and sometimes Ashes. It hath a strange propriety; for in warm Water, it swelleth, and openeth extremely. It is not green, but of a dusky brown colour. And it is used for curiosities, and inflammations in the Throat, whereby it seemeth to have a mollifying, and lenifying vertue.

There is a kind of Spongy excitencence, which growth chiefly upon the Roots of the Lather-Tree, and sometimes upon Cedar, and other Trees. It is very white, and light, and fryable; which we call Agrick. It is famous in Physick for the purging of tough Phlegm. And it is also an excellent opener for the Liver, but offensive to the Stomach; and in taste it is, at the first sweet and after bitter.

We finde no Super-Plant, that is a formed Plant, but Mistletoe. They have antique Tradition, that there is a Bird called a Mistle-Bird, that feedeth upon a Seed, which many times they cannot digesit, and to expelleth it whole with her Excrement; which falling upon a Bough of a Tree, that hath some rifs, putteth forth Mistletoe. But this is a Fable; for it is not probable, that Birds should feed upon that they cannot digesit. But allow
that, yet it cannot be for other Reasons: For first, it is found but upon certain Trees; and those Trees bear no such Fruit, as may allure that Bird to sit and feed upon them. It may be, that Bird feedeth upon the Mistletoe-Berries, and so is often found there; which may have given occasion to the tale. But that which maketh an end of the question, is, that Mistletoe hath been found to put forth under the Boughs, and not (only) above the Boughs; so it cannot be anything that filleth upon the Bough. Mistletoe growth chiefly upon Crab-trees, Apple-trees, sometimes upon Hales, and rarely upon Oaks; the Mistletoe whereof is counted very Medicinal. It is ever green, Winter and Summer, and beareth a white glittering Berry; and it is a Plant, utterly differing from the Plant, upon which it groweth. Two things therefore may be certainly set down: First, that Superfication must be by abundance of Sap, in the Bough that putteth it forth. Secondly, that that Sap must be such as the Tree doth exsern, and cannot assimilate, for else it would go into a Bough; and besides, it seemeth to be more fat and unctuous, than the ordinary Sap of the Tree; both by the Berry which is clammy, and by that it continueth green Winter and Summer, which the Tree doth not.

This Experiment of Mistletoe may give light to other practices; therefore trial would be made, by ripping of the Bough of a Crab-tree in the Bark, and watering of the Wound every day, with warm water dunged, to see if it would bring forth Mistletoe, or any suchlike thing. But it were yet more likely, to try it with some other watering or anointing, that were not natural to the Trees as Water is; as Oyl, or Barm of Drink, &c. So they be such things as know not the Bough.

It were good to try, what Plants would put forth, if they be forbidden to put forth their natural Boughs: Powl therefore a Tree, and cover it, some thickness with Clay on the top, and see what it will put forth. I suppose it will put forth Roots; for so will a Cion, being turned down into Clay. Therefore in this Experiment also, the Tree would be closed with somewhat that is not so natural to the Plants as Clay is; try it with Leather, or Cloth, or Painting, so it be not hurtful to the Tree. And it is certain, that a Brake hath been known to grow out of a Pollard.

A Man may count the Prickes of Trees to be a kind of Excrecence, for they will never be Boughs, nor bear Leaves. The Plants that have Prickles, are Thorns, Black and White; Bryer, Rose, Lemenon-trees, Crab-trees, Gooseberry, Berberry; these have it in the Bough. The Plants that have Prickles in the Leaf are, Holly, Juniper, Whin bult, Thistle; Nettles also have a small venemous Prickle, so hath Borage, but harmless. The cause must be, haufy putting forth, want of moisture, and the clofeness of the Bark: For the haste of the Spirit to put forth, and the want of nourishment to put forth a Bough, and the closefenes of the Bark, cause Prickles in Boughs; and therefore they are ever like a Pyramid, for that the moisture spendeth after a little putting forth. And for Prickles in Leaves, they come alfo of putting forth more Juice into the Leaf, that can spread in the Leaf smooth, and therefore the Leaves otherwife are rough, as Burrege and Nettles are. As for the Leaves of Holly, they are smooth, but never plain, but as it were with folds for the same cause.

There be also Plants, that though they have no Prickles, yet they have a kind of Downey or Velvet Rine upon their Leaves; as Rose-Campion Stock-Gilliflowers, Celar-foos; which Down or Nap acometh of a subtle Spirit, in a soft or fat substance. For it is certain, that both Stock-Gilliflowers, and Rose-Campions,
Century V I.

Campions, stamped, have been applied (with succeds) to the Wrets of those that have had Terrion or Quartan agues; and the Vapor or Colds-foot have a fanative vertue towards the Lungs, and the Leaf also is healing in Surgery.

Another kinde of Excrecence is an Exudation of Plants, joyned with Putrefaction, as we see in Oak-Apples, which are found chiefly upon the Leaves of Oaks, and the like upon Willows: And Counrty people have a kinde of Prediction, that if the Oak-Apple, broken, be full of Worms, it is a sign of a pestilent year; which is a likely thing, because they grow of corruption.

There is also upon Sweet, or other Brier, a fine Tuft, or Brash of Moss of divers colours; which if you cut, you shall ever finde full of little white Worms.

It is certain, that Earth taken out of the Foundations of Paulis and Houses and bottoms of Wells, and then put into Pots, will put forth fundry kinde of Herbs: But some time is required for the Germination; for if it be taken but from a Fathom deep, it will put forth the first year, if much deeper, not till after a year or two.

The nature of the Plants growing out of the Earth so taken up, doth follow the nature of the Mould it self, as if the Mould be soft and fine, it putteth forth soft Herbs; as Grass, Plantain, and the like: If the Earth be harder and courser, it putteth forth Herbs more rough, as Thistles, Firs, &c.

It is common Experience, that where Alleys are close gravelled, the Earth putteth forth the first year Knot Grass, and after Spire Grass. The cause is, for that the hard Gravel or Pebble at the first laying, will not suffer the Grass to come forth upright, but turneth it to finde his way where it can; but after that the Earth is somewhat loosened at the top, the ordinary Grass cometh up.

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 juicy substanct; as Penny-wort, Purslane, Housteek, Penny Royal, &c.

The Water also doth send forth Plants that have no Roots fixed in the bottom; but they are few and perfect Plants being almost but Leaves, and those small ones: Such is that we call Duck-weed, which hath a Leaf no bigger than a Thyme Leaf, but of a fresher Green, and putteth forth a little string into the Water, far from the bottom. As for the Water-Lilly, it hath a Root in the Ground; and so have a number of other Herbs that grow in Ponds.

It is reported by some of the Ancients, and some Modern Testimony likewise, that there be some Plants, that grow upon the top of the Sea; being suppos'd to grow of some concretion of Slime from the Water, where the Sun heateth hot, and where the Salt isareth little. As for the Alga Marina, (Sea-weed) and Entergium (Sea-Thistle) both the Roots; but have Sea-weed under the Water, the Sea-Thistle but upon the Shore.

The Ancients have noted, that there are some Herbs that grow out of Snow, laid up close together, and putrifled: and that they are all bitter, and they name one especially, Flammus, which we call Marsh-Milotin. It is certain, that Worms are found in Snow commonly, like Earth-worms; and therefore it is not unlike, that it may likewise putteth forth Plants.
The Ancients have affirmed, that there are some Herbs that grow out of Stone, which may be, for that it is certain, that Toads have been found in the middle of a Freestone. We see also, that Flints lying above ground gather Moss; and Wall-flowers, and some other Flowers grow upon Walls. But whether upon the main Brick or Stone, or whether out of the Lime, or Chinks, is not well observed. For Elders and Ashes have been seen to grow out of Steepless: but they manifestly grow out of Clefts, in so much as, when they grow big, they will disjourn the Stone. And besides, it is doubtful, whether the Mortar itself putteth it forth, or whether some Seeds be not let fall by Birds. There be likewise Rock-Herbs, but I suppose those are, where there is some Mould or Earth. It hath likewise been found, that great Trees, growing upon Quarries, have put down their Root into the Stone.

In some Mines in Germany, as is reported, there grow in the bottom Vegetables; and the Workfolks use to say, They have Magical Virtue, and will not suffer men together them.

The Sea-sands seldom bear Plants. Whereof the cause is yielded by some of the Ancients, for that the Sun exhales the Moisture, before it can incorporate with the Earth, and yield a Nourishment for the Plant. And it is affirmed also, that Sand hath (always) his Root in Clay; and that there be no Veins of Sand, any great depth within the Earth.

It is certain, that some Plants put forth for a time of their own store, without any Nourishment from Earth, Water, Stone, &c. Of which, vide the Experiments.

It is reported, That Earth that was brought out of the Indies, and other remote Countreys for Ballast for Ships, call upon some Grounds in Italy, did put forth Foreign Herbs, to us in Europe not known; and, that which is more, that of their Roots, Barks, and Seeds, conjoined together, and mingled with other Earth, and well watered with warm Water, there came forth Herbs much like the other.

Plants, brought out of hot Countreys, will endeavor to put forth at the same time, that they do usually do in their own climate; and therefore to preserve them, there is no more required than to keep them from the injury of putting back by Cold. It is reported also, that Grain out of the hotter Countreys transplanted into the Colder, will be more forward than the ordinary Grain of the cold Country. It is likely, that this will prove better in Grains, than in Trees; for that Grains are but Annual, and to the vertue of the Seed is not worn out; whereas in a Tree, it is embased by the Ground, to which it is removed.

Many Plants, which grow in the hotter Countreys, being set in the colder, will nevertheless, even in those cold Countreys, being sown of Seeds late in the Spring come up and abide most part of the Summer; as we finde it in Orenge, and Lemon-Seed, &c. The Seeds whereof, sown in the end of April, will bring forth excellent Sallets, mingled with other Herbs. And I doubt not, but the Seeds of Clove-Tree, and Pepper-Seeds, &c. If they could come hither Green enough to be sown, would do the like.

There
Here be some Flowers, Blossoms, Grains; and Fruits, which come more early, and others which come more late in the year. The Flowers that come early with us, are, Prime-Roses, Violets, Anemonies, Water-Daffodills, Crocus Firmus, and some early Tulipps. And they are all cold Plants, which therefore (as it should seem) have a quicker Perception of the heat of the Sun increasing, than the Hot Herbs have, 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 Pinks, Roses, Flowerdeluces, &c. And the latest are, Gilly-flowers, Holly-Oaks, Larks-Foot, &c. The earliest Blossoms are, the Blossoms of Peaches, Almonds, Cornelian, Mezerions, &c. And they are of such Trees, as have much moisture, either Water, or Oily. And therefore Crocus Firmus also, being an Herb that hath an Oily Juice, putteth forth early. For those also finde the Sun sooner than the dryer Trees. The Grains are, first Rye and Wheat, then Oats and Barley, then Pea and Beans; for though Green Pea and Beans be eaten sooner, yet the dry ones that are set for Horse-meat, are ripe last; and it seemeth, that the latter Grain cometh first. The earliest Fruits are, Strawberries, Cherries, Gooseberries, Corrons; and after them early Apples, early Pears, Apricots, Raisps: and after them, Damsons, and most kind of Plumbs, Peaches, &c. And the latest are, Apples, Wardens, Grapes, Nuts, Quinces, Almonds, Stoes, Brier-berrys, Heps, Medlars, Servicrs, Cornelians, &c.

It is to be noted, That (commonly) Trees that ripen last, blossom soonest; as Peaches, Cornelians, Stoes, Almonds, &c. And it seemeth to be a work of providence that they blossom so soon, for otherwise they could not have the Sun long enough to ripen.

There be Fruits (but rarely) that come twice a year; as some Pears, Strawberries, &c. And it seemeth, they are such as abound with nourishment, whereby after one period, before the Sun waxeth too weak, they can endure another. The Violets also, amongst Flowers, cometh twice a year, especially the double White, and that also is a Plant full of moisture. Roses come twice, but it is not without cutting, as hath been formerly said.

In Muscovia, though the Corn cometh not up till late Spring, yet their Harvest is as early as ours. The cause is, for that the strength of the Ground is kept in with the Snow; and we see with us, that if it be a long Winter, it is commonly a more plentiful year: And after those kindes of Winters likewise, the Flowers and Corn which are earlier and later, do come commonly at once, and at the same time; which troubleth the Husbandman many times: For you shall have Red-Roses and Damask-Roses cometh together, and likewise the Harvest of Wheat and Barley. But this happeneth ever, for that the earlier stayeth the later, and not that the later cometh sooner.

There be divers Fruit Trees, in the hot Countreys, which have Blossoms, and young fruit, and ripe fruit, almost all the year, succeeding one another. And it is said, the Orange hath the like with us, for a great part of Summer, and so also hath the Fig. And no doubt, the Natural Motion of Plants is to have so: But that either they want Juice to spend, or they meet with the cold of the Winter, And therefore this Circle of ripening cannot be, but in suenulent Plants, and hot Countreys.
Natural History;

Some Herbs are but Annual, and die Root and all once a year; as Borrago, Lettuce, Cucumbers, Musk Melons, Baffi, Tobacco, Mustard seed, and all kindes of Corn; some continue many years, as Hyssope, Germander, Lavender, Fennel, &c. The cause of the Dying is double; the first is, the tenderness and weakness of the Seed, which maketh the period in a small time, as it is in Borrago, Lettuce, Cucumbers, Corn, &c. And therefore none of these anchor. The other cause is, for that some Herbs can worke endure cold, as Baffi, Tobacco, Mustard seed; and these have (all) much heat.

The lasting of Plants, is most in those that are largest of Body, as Oaks, Elm, Chestnuts, the Laurel tree, &c. And this holdeth in Trees, but in Herbs it is often contrary; for Borrago, Coleworts, Pompions, which are Herbs of the largest size, are of small durance; whereas Hyssope, Winter-Savory, Germander, Time, Sage, will last long. The cause is, for that Trees laft according to the strength, and quantity of their Sap and Juice, being well minitred by their Bark, against the injuries of the Air: But Herbs draw a weak Juyc, and have a soft Stalk; and therefore those amongst them which laft longest, are Herbs of strong smell, and with a stickly stalk.

Trees that bear Mast and Nuts, are commonly more lasting than those that bear Fruits, especially the moister Fruits; as Oaks, Beeches, Chestnuts, Walnuts, Almonds, Pine trees, &c. last longer than Apples, Pears, Plumbs, &c. The cause is, the fatness, and oyliness of the Sap; which ever wasteth less, than the more Watry.

Trees that bring forth their Leaves late in the year, and cast them likewise late, are more lasting than those that sprount their Leaves early, or shed them betimes. The cause is, for that the late coming forth, froweth a moisture more fixed; and the other loose, and more easily resolved. 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, Bulches, and Herbs, so much as often cutt; for every cutting caueth a renovation of the juice of the Plant; that it neither goeth so far, nor riseth so faintly, as when the Plant is not cut: Infomuch, as Annual Plants, if you cut them seasonably, and will spare the use of them, and suffer them to come up still young, will laft more years than one, as hath been partly toucht; such as is Lettuce, Purflane, Cucumber, and the like. And for great Trees, we see almost all overgrown Trees in Church-yards, or near ancient Building, and the like, are Pollards or Dottards, and not Trees at their full height.

Some Experiment would be made, how by Art to make Plants more lasting than their ordinary period; as to make a Stalk of Wheat, &c. last a whole year. You must ever preluppe, that you handle it so, as the Winter killeth it not; for we speak only of prolonging the Natural Period. I conceive, that the Rule will hold, That whatsoever maketh the Herb come later, than at his time will make it last longer time: It were good to try it in a Stalk of Wheat, &c. let in the hade, and encompassed with a case of Wood, not touching the Straw, to keep out open Air.

As for the Preservation of Fruits, as well upon the Tree or Stalk, as gathered, we shall handle it under the Title of Conservation of Bodies.
The Particular Figures of Plants we leave to their descriptions, but some few things in general, we will observe. Trees and Herbs, in the growing forth of their Boughs and Branches, are not figured, and keep no order. The cause is, for that the Sap, being restrained in the Rinde and Bark, breaks not forth at all. (as in the Bodies of Trees, and Stalks of Herbs,) till they begin to branch, and then, when they make an eruption, they break forth casually, where they finde best way in the Bark or Rinde. It is true, that some Trees are more scattered in their Boughs: as Sallow trees, Warden-trees, Quince-trees, Medlar-trees, Lemon tree, &c. Some are more in the form of a Pyramis, and come almost to top; as the Pear-trees (which the Cisticks will have to borrow his name of α π ι Fire) Orange-trees, Fir-trees, Service-trees, Lime-trees, &c. And some are more spred and broad, as Beeches, Horn-beam, &c. The rest are more indifferent. The cause of scattering the Boughs is, the hardy breaking forth of the Sap; and therefore those Trees rise not in a Body of any height, but Branch near the Ground. The cause of the Pyramis, is the keeping in of the Sap, long before it branch, and the spreading of it, when it beginneth to branch, by equal degrees: The spreading is caus’d, by the carrying up of the Sap plentifully, without expence, and then putting it forth speedily, and at once.

There be divers Herbs, but no Trees, that may be said to have some kind of order, in the putting forth of their Leaves: For they have Joynets, or Knuckles, as it were stops in their Germination; as have Gilliflowers, Pinks, Fennel, Corn, Reeds, and Canes. The cause whereof is, for that the Sap ascendeth unequally, and doth (as it were) tire and stop by the way. And it seemeth, they have some closeness and hardness in their Stalk, which hindereth the Sap from going up, until it hath gathered into a knot, and so is more urged to put forth. And therefore, they are most of them hollow, when the Stalk is dry; as Fennel Stalks, Stubble, and Canes.

Flowers have (all) exquisite Figures, and the Flower numbers are (chiefly) five and four; as in Prime-Roses, Byster-Roses, single Mukey-Roses, single Pinks, and Gilliflowers, &c. which have five Leaves; Lillies, Flower-de-luces, Baroge, English, &c. which have four Leaves. But some put forth Leaves not numbred, but they are ever small ones; as Margolds, Trifole, &c. We see also, that the Sockets, and Supporters of Flowers, are figured; as in the five Brethren of the Rose, Sockets of Gilliflowers, &c. Leaves also are all figured, some round, some long, none square, and many jagged on the sides; which Leaves of Flowers seldom are. For, I account, the jagging of Pinks, and Gilliflowers, to be like the inequality of Oak-leaves, of Fine-leaves, or the like; but they seldom or never have any small Purfs.

Of Plants some few put forth their Blossoms before their Leaves; as Almonds, Peaches, Cornelian, Black-Thorn, &c. But most put forth some Leaves before their Blossoms; as Apples, Pears, Plumbs, Cherry, White-Thorn, &c. The cause is for that those that put forth their Blossoms first, have either an acute and sharp spirit; (and therefore commonly they all put forth early in the Spring, and ripen very late, as most of the particulars before mentioned) or else an only Juice, which is apter to put out Flowers than Leaves.

Of Plants some are Green all Winter, others cast their Leaves. There are Green all Winter, Holly, Ivy, Box, Firr, Eugh, Cypress, Juniper, Bays, Rosemary, &c. The cause of the holding Green, is the close and compact sub-M

stance
flance of their Leaves, and the Pedicles of them. And the caufe of that again, is, either the tough and viscous Juice of the Plant, or the Strength and heat thereof. Of the firft fort, is Holly; which is of so viscous a Juice, as they make Birdlime of the Bark of it. The Stalk of Ivy is tough, and not fragile, as we fee it in other small Twigs dry. First yieldeth Pitch. Box is tall and heavy Wood, as we fee it in Bowls. English is a strong and tough Wood, as we see it in Bowls. Of the second fort, is Juniper, which is a Wood odorate, and maketh a hot Fire. Bays is likewise a hot and aromatical Wood, and fo is Rosemary for a Shrub. As for the Leaves, their density appeareth in that, either they are smooth and shining, as in Bays, Holly, Ivy, Box, &c. or in that they are hard and spiry, as in the rest. And tryal would be made if Grafting of Rosemary, and Bays, and Box, upon a Holly Stock, because they are Plants that come all Winter. It were good to try it also with Grafts of other Trees, either Fruit trees, or Wild-trees, to fee whether they will not yield their Fruit, or bear their Leaves later, and longer in the Winter; because the Sap of the Holly putteth forth mott in the Winter. It may be also a Mezerion-tree grafted upon a Holly, will prove both an earlier, and a greater Tree.

There are some Plants that bear no Flower, and yet bear Fruit; there are some that bear Flowers, and no Fruit; there are some that bear neither Flowers nor Fruit. Most of the great Timber-trees, (as Oaks, Beeches, &c.) bear no apparent Flowers; some few (likewise) of the Fruit-trees, as Mulberry, Walnuts, &c. And some Shrubs, (as Juniper, Holly, &c.) bear no Flowers. Divers Herbs also bear Seeds, (which is as the Fruit,) and yet bear no Flowers, as Purslane, &c. Those that bear Flowers, and no Fruit, are few, as the double Cherry, the Sallow, &c. But for the Cherry, it is doubtful, whether it be not by Art or Culture; for if it be by Art, then tryal would be made, whether Apples and other Fruits Blossoms may not be doubled. There are some few, that bear neither Fruit, nor Flower; as the Elm, the Poplars, Box, Braks, &c.

There are some Plants that fhoot still upwards, and can support themselves, as the greatest part of Trees and Plants: There be some other, that creep along the Ground, or wind about other Trees, or props, and cannot support themselves; as Vines, Ivy, Bryar, Briony, Wood-bines, Hops, Climais, Camomil, &c. The cause is, (as hath been partly touched) for that all Plants, (naturally) move upwards; but if the Sap put up too fast, it maketh a flobber Stalk, which will not support the weight; and therefore these latter fort are all swift and hasty comers.

The firft and most ordinary help is Stercation. The Sheep-dung is one of the beft; and next, the Dung of Kine; and thirdly, that of Horses; which is held to be somewhat too hot, unless it be mingled; that of Pigeons for a Garden, as a small quantity of Ground, excelleth. The ordering of Dung is, if the Ground be Arable, to spread it immediately before the Ploughing and Sowing, and to to Plough it in: For if you spread it long before, the Sun will draw out much of the fervice of the Dung: If the Ground be Grazing Ground, to spread it somewhat later towards Winter, that the Sun may have theleis power to dry it up. As for special Compostis for Gardens (as a Hot Bed, &c.) we have handled them before.

The second kinde of Compost is, the spreading of divers kindes of Earth; as Marl, Chalk, Sea Sand, Earth upon Earth, Pond-Earth, and the mixtures of them. Marl is thought to be the beft, as having most fimate. And not heating
heating the Ground too much. The next is Sea-sand, which (no doubt) obtained a special vertue by the Salt; for Salt is the first rudiment of life. Chalk over-heateh the Ground a little; and therefore is best upon cold Clay Grounds, or moist Grounds: But I heard a great Husband say, that it was a common error to think that Chalk helpeth Airable Grounds, but helpeth not Grazing Grounds, whereas (indeed) it helpeth Grasfs as well as Corn. But that which brendeth the error is, because after the chalking of the Ground, they wear it out with many Crops, without rest; and then (indeed) afterwards it will bear little Grasfs; because the Ground is tired out. It were good to try the laying of Chalk upon Airable Grounds, a little while before Ploughing, and to Plough it in, as they do the Dung; but then it must be Friable first, by Rain or Lying: As for Earth it compassteth itself; for I knew a great Garden, that had a Field (in a manner) poured upon it; and it did bear Fruit excellently the first year of the Planting; for the Surface of the Earth is ever the fruitfullest: And Earth to prepared hath a double Surface. But it is true, as I conceive, that such Earth as hath Salt-Peter bred in it, if you can procure it without too much charge, doth excel. The way to hasten the breeding of Salt-Peter, is to forbid the Sun, and the growth of Vegetables. And therefore, if you make a large Hovel, thatched, over some quantity of Ground; nay, if you do but planck the Ground over, it will breed Salt-Peter. As for Pond-earth or River-earth, it is a very good compoft, especially, if the Pond have been long uncleaned, and the Water be not too hungry; and I judge it will be yet better, if there be some mixture of Chalk.

The third help of Ground is, by some other Substances that have vertue to make Ground Fertile: though they be not merely Earth, wherein Alhes excel; inasmuch as the Countrys about Emusat and Vesuvius have a kinde of amends made them, for the mischief the eruptions (many times) do, by the exceeding fruitfulness of the soyl caused by the Alhes scattered about. Soot also, that thin, spread in a Field or Garden, is tried to be a very good compoft. For Salt it is too costly; but it is tried, that mingled with Seed-corn, and sown together, it doth good: And I am of opinion, that Chalk in Powder, mingled with Seed-corn, would do good; perhaps as much as Chalking the Ground all over. As for the Sweeping of the Seeds in several mixtures with Water, to give them vigor, or watering Grounds with Compoft-water, we have spoken of them before.

The fourth help of Ground is, the suffering of Vegetables to die into the Ground, and so to fatten it; as the Stubble of Corn, especially Pease. Brakes call upon the Ground in the beginning of Winter, will make it very fruitful. It were good (also) to try whether Leaves of Trees swept together, with some Chalk and Dung mixed, to give them more heart, would not make a good Compoft: For there is nothing lost, so much as Leaves of Trees, and as they lie scattered, and without mixture, they rather make the Ground four, than otherwise.

The fifth help of Ground is, Heat and Warmth. It hath been anciently practis’d to burn Heath, and Ling and Sedge, with the vantage of the Wind, upon the Ground. We see, that Warmth of Walls and Incloures, mendeth Ground; we see also, that lying open to the South, mendeth Ground; we see again that the Foldings of Sheep help Ground as well by their warmth, as by their compoft: And it may be doubted, whether the covering of the Ground with Brakes, in the beginning of the Winter (whereof we spake in the last Experiment) helpeth it not, by reason of the Warmth. Nay, some very good
Husbands do suspect, that the gathering up of Flints in Flinty Ground, and laying them on heaps (which is much used) is no good Husbandry for that they would keep the Ground warm.

The sixth help of Ground is, by Watering and Irrigation, which is in two manners; The one by Letting in, and Shutting out Waters, at reasonable times; for Water, at some seasons, and with reasonable stay, doth good; but at some other seasons, and with too long stay, doth hurt. And this serveth only for Meadows, which are along some River. The other way is to bring Water from some hanging Grounds, where there are Springs into the lower Grounds, carrying it in some long Furrows, and from those Furrows, drawing it traverse to spread the Water: And this maketh an excellent improvement, both for Corn and Gras. It is the richer, if those hanging Grounds, be fruitful, because it wasteth off some of the fatness of the Earth; but howsoever it profiteth much. Generally where there are great overflows in Fens, or the like, the drowning of them in the Winter, maketh the Summer following more fruitful: The cause may be for, that it keepeth the Ground warm, and nourisheth it. But the Fen-men hold, that the Sewers must be kept so, as the Water may not stay too long in the Spring, till the Weeds and Sedge be grown up; for then the Ground will be like a Wood which keepeth out the Sun, and so continueth the wet; whereby it will never graze (to purpose) that year. Thus much for Irrigation; but for Avoidances, and Drainings of Water, where there is too much, and the helps of Ground in that kinde, we shall speak of them in another place.
The differences between Animate and Inanimate Bodies, we shall handle fully under the Title of Life, and Living Spirits, and Powers. We shall therefore make but a brief mention of them in this place. The main differences are two. All Bodies have Spirits, and Pneumatical parts within them; but the main differences between Animate and Inanimate are two. The first is, that the Spirits of things animate, are all confined with themselves, and are branched in Veins, and secret Sanales, as Blood is: And in Living Creatures, the Spirits have not only Branches, but certain Sells or Seats, where the principal Spirits do reside, and whereunto the rest do resort: But the Spirits in things Inanimate are shut in, and cut off by the Tangibile parts; and are not pervious one to another, as Air is in Snow. The second main difference is, that the Spirits of Animate Bodies are all in some degree (more or less) kindled and inflamed; and have a fine commixture of Flame, and an Aerial substance: But Inanimate Bodies have their Spirits no whit inflamed or kindled. And this difference consisteth not in the Heat or Coolness of Spirits; for Clover and other Spices, Naphtha and Petroleum, have exceeding hot Spirits (hotter a great deal than Oyl, Wax, or Tallow, &c.) but not inflamed. And when any of those weak and temperate Bodies come to be inflamed, than they gather a much greater heat, than others have uninflamed, besides their light and motion, &c.

The differences which are secondary, and proceed from these two radical differences are, first, Plants are all figurate and determinate, which Inanimate Bodies are not; for look how far the Spirit is able to spread and continue it self, so far goeth the shape or figure, and then is determined. Secondly, Plants do nourish, inanimate Bodies do not; they have an Accretion, but no Alimentation. Thirdly, Plants have a period of life, which Inanimate Bodies have not. Fourthly, they have a succession and propagation of their kinde, which is not in Bodies inanimate.
The differences between plants and Metals, or Fossiles besides those four beforementioned, (for Metals I hold inanimate) are these: First, Metals are more durable than Plants: Secondly, they are more solid and hard; thirdly, they are wholly subterraneous; whereas Plants are parts above Earth, and part under Earth.

There are very few Creatures that participate of the Nature of Plants, and Metals both; Coral is one of the nearest of both kindes, another is Vireuol, for that is aptest to sprout with moisture.

Another special Affinity is between Plants and Mouth, or Putrefaction: For all Putrefaction, (if it dissemble not in Arefaction) will in the end issue into Plants or Living Creatures bred of Putrefaction. I account Moss, and Mushrooms, and Ascaris, 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 them selves, and a number of other things, after a Mouldiness, or Rosiness, or Corruppation, they will fall to breed Worms. These Putrefactions, which have Affinity with Plants, have this difference from them; that they have no Suckession or propagation, though they nourish, and have a period of Life, and have likewise some Figure.

I left once, by chance, a Carrot cut in a close room, for three Sommer months, that I was absent; and at my return, there were grown forthout of the Fith cut, Tufis of Hairs, an inch long, with little black Heads as if they would have become Herb.

The Affinities and Differences between Plants and Living Creatures, are these that follow. They have both of them, Spirits continued and branched, and also inflamed. But first in Living Creatures the Spirits have a Cell or Seat, which Plants have not, as was also formerly said. And secondly, the Spirits of Living Creatures hold more of Flame, than the Spirits of Plants do; and these two are the Radical differences. For the Secondary differences, they are as follow. First, Plants are all fixed to the Earth; whereas all Living Creatures are fevered, and of themselves. Secondly, Living Creatures have Local Motion, Plants have not. Thirdly, Living Creatures nourish from their upper parts by the Mouth chiefly; Plants nourish from below, namely from the Roots. Fourthly, Plants have their Seed and Seminal parts uppermost, Living Creatures have them lowermost; and therefore it was said, not elegantly alone, but philosophically: Homo est Planta inverta. Man's like a Plant turned upwards; For the Root in Plants, is as the Head in Living Creatures. Fifthly, Living Creatures have a more exact Figure than Plants. Sixthly, Living Creatures have more diversity of Organs within their Bodies and (as it were) inward Figures than Plants have. Seventhly, Living Creatures have Senes, which Plants have not. Eighthly, Living Creatures have Voluntary Motion, which Plants have not.

For the difference of Sexes in Plants, they are oftentimes by name distinguished: as Male-Pinion, Female-Pinion; Male Rosemary, Female-Rosemary; He-Holly, She-Holly, &c. But Generation by Copulation (certainly) extendeth not to Plants. The nearest approach of it, is between the He-Palm, and the She-Palm, which (as they report) if they grow near, incline the one to the other; infomuchas, (that which is more strange) they doubt not to report, that to keep the Trees upright from bending, they tye Ropes or Lines from the one to the other, that the contact might be enjoyed by the contact of a middle Body. But this may be feigned, or at least amplified. Nevertheless,
am apt enough to think, that this time Binaria of a stronger and a weaker, like unto Magelian and Feminine, doth hold in all Living Bodies. It is confounded sometimes; as in some Creatures of the Creation, wherein no marks of distinction appear; and it is doubled sometimes, as in Hermaphrodites: but generally there is a degree of strength in most Species.

The Participles or Confiners between Plants and Living Creatures, are such chiefly as are fixed; and have not Local Motion of remove; though they have a Motion in their parts, such as Oysters, Cockles, and such like. There is a fabulous Narration, That in the Northern Countries there should be an Herb that groweth in the likeness of a Lamb, and feedeth upon the Grass, in such sort, as it will bear the Grass round about. But I suppose, that the Figure maketh the Fable; for we see there bee Flower, &c. And as for the Grass, it seemeth the Plant, having a great stalk and top, doth prey upon the Grass a good way about, by drawing the Juice of the Earth from it.

The Indian Fig boweth his Roots down follow in one year, as of itself it taketh Root again; 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 softness of the stalk, which maketh the Bough, being over-loaden, and not stiffly upheld, weigh down. It hath Leaves as broad as a little Target, but the Fruit no bigger than Beans. The cause is, for that the continual shade increaseth the Leaves, and abateth the Fruit; which nevertheless is of a pleasant taste. And that (no doubt) is causeth, by the supplenefs and gentlenefs of the Juice of that Plant, being that which maketh the Boughs also so flexible.

It is reported by one of the Ancients, that there is a certain Indian Tree, having few, but very great Leaves, three cubits long, and two broad; and that the Fruit being of good taste, groweth out of the Bark. It may be, there be Plants that pour out the Sap so fast, as they have no leisure, either to divide into many Leaves, or to put forth Stalks to the Fruit. With us Trees generally have small Leaves in comparison. The Fig hath the greatest, and next it the Pine, Mulberry, and Yew, and the least are those of the Willow, Birch, and Thorn. But there be found Herbs with far greater Leaves than any Tree; as the Bar, Gourd, Cucumber, and Caleworts. The cause is, (like to that of the Indian Fig) the hafty and plentiful putting forth of the Sap.

There be three things in use for sweetnees, Sugar, Honey, &c. For Sugar, to the Ancients it was scarce known, and little used. It is found in Canes; Quere, whether to the first Knuckle, or further up? and whether the very Bark of the Canes it self do yield Sugar, or no? For Honey, the Bee maketh it, or gathereth it; but I have heard from one, that was industrious in Husbandry, that the labor of the Bee is about the Wax, and that he hath known in the beginning of May, Honey-Combs empty of Honey, and within a fortnight, when the sweet Dewes fall, filled like a Cellar. It is reported by some of the Ancients, that there is a Tree called Osthus, in the Valleys of Egypt, that distilleteth Honey in the Mornings. It is not unlike, that the Sap and Tears of some Trees may be sweet. It may be also, that some sweet Juices, fit for many uses, may be concocted out of Fruits, to the thicknes of Honey, or perhaps of Sugar; the likeliest are Rasins of the Sun, Figs, and Corrans: The Means may be enquired.

The Ancients report of a Tree, by the Persian Seas, upon the Shore-lands, which
which is nourished with the Salt-water; and when the Tide ebbeth, you shall see the Roots, as it were, bare without Bark (being, as it seemeth, corroded by the Salt) and grasping the Sands like a Crab, which nevertheless beareth a Fruit. It were good to try some hard Trees, as a Service-Tree or Fir-Tree, by setting them within the Sands.

There be of Plants which they use for Garments, the use that follow, Hemp, Flax, Cotton, Nettle, (whereof they make Nettle Cloth) Sericum, which is a growing Silk; they make also Cables of the Bark of Lume-Trees. It is the Silk that maketh the Filaceum matter commonly, and sometimes the Down that groweth above.

They have in some Countreys, a Plant of a Rosy-colour, which flowereth in the Night, openeth in the Morning, and openeth wide at Noon; which the Inhabitants of those Countreys say, is a Plant that sleepeth. There be Sleepers enough then; for almost all Flowers do the like.

Some Plants there are, but rare, that have a Mossie or Downy Root, and likewise that have a number of Threads like Beards, as Mandrakes; whereof Witches and Impostors make an ugly Image, giving it the form of a face at the top of the Root, and leave those strings to make a broad Beard down to the foot. Also there is a Kinde of Nard in Trees (being a Kinde of Fum) that hath a Root hairy, like a Rough-footed Doves foot. So as you may see, there are of Roots, Bulbous Roots, Fibrous Roots, and Hairie Roots. And, I make it, in the Bulbous, the Sapphiremost molten to the Air and Sun: In the Fibrous, the Sap delighteth more in the Earth, and therefore putteth downward: and the Hairie is a middle between both, that besides the putting forth upwards and downwards, putteth forth in round.

There are some Tears of Trees, which are kembered from the Beards of Goats; for when the Goats bite and crop them, especially in the Mornings, the Dew being on, the Tear cometh forth, and hangeth upon their Beards: Of this sort is some Kinde of Ladanum.

The Irrigation of the Plane-tree by Wine, is reported by the Ancients, to make it fruitful. It would be tried likewise with Roots; for upon Seeds it worketh no great effect.

The way to Carry Foreign Roots; a long way, is to vessel them close in Earthen vessels; but if the Vessels be not very great, you must make some holes in the bottom, to give some refreshment to the Roots; which otherwise (as it seemeth) will decay, and suffocate.

The ancient Cinnamon, was, of all other Plants, while it grew, the dryest; and those things which are known to comfort other Plants, did make that more sterile; for in flowers it prospered worst: It grew also amongst bushes of other Kinde, where commonly Plants do not thrive, neither did it love the Sun. There might be one cause of all those effects, namely, the sparing nourishment, which that Plant required. Quere, how far Cassia, which is now the Substitue of Cinnamon, doth participate of those things.

It is reported by one of the Ancients, that Cassia, when it is gathered, is put into the Skins of Beasts newly flayed; and that the Skins corrupting; and breathing Worms, the Worms do devour the Pith and Marrow of it, and so make it hollow, but meddle not with the Bark, because to them it is bitter.

There were in ancient time, Vines of far greater Bodies, than we know any; for there have been Cups made of them, and an Image of Jupiter. But it is like they were wild Vines; for the Vines that they use for Wine, are often
Grapes, and so much digged and dressed, that their Sap sippeth into the Grapes, and so the Stalk cannot increase much in bulk. The Wood of Vines is very durable, without rotting. And that which is strange, though no Tree hath the Twigs, while they are green, so brittle, yet the Wood dried is extreme tough, and was used by the Captains of Armies amongst the Romans for their Cudgels.

It is reported, That in some places, Vines are suffer'd to grow like Herbs spreading upon the Ground, and that the Grapes of those Vines are very great. It were good to make tryal, whether Plants that be born up by props, will put forth greater Leaves, and greater Fruits if they be laid along the Ground; as Hops, Ivy, Woodbine, &c.

Quinces or Apples &c., if you will keep them long, drown them in Honey; but because Honey (perhaps) will give them a taffc over-lushious, it were good to make tryal in Powder of Sugar, or in Syrump of Wine only boiled to height. Both those would likewise be tried in Oranges, Lemmons, and Pomegranates; for the Powder of Sugar, and Syrup of Wine, will serve for times more than once.

The Conservation of Fruits would be also tried in Vessels, filled with fine Sand, or with Powder of Chalk, or in Meal and Flower, or in Dust of Oak-wood, or in Mill.

Such Fruits as you appoint for long keeping, you must gather before they be full ripe, and in a fair and dry day, towards Noon; and when the Wind bloweth not South, and when the Moon is under the Earth, and in decrease.

Take Grapes, and hang them in an empty Vessel, well stopped; and let the Vessel 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 keep better in a Vessel half full of Wine, so that the Grapes touch not the Wine.

It is reported, that the preserving of the Stalk, helpeth to preserve the Grapes; especially, if the Stalk be put into the Pith of Elder, the Elder not touching the Fruit.

It is reported by some of the Ancients, that Fruit put into Bottles; and the Bottles let down into Wells under water, will keep long.

Of Herbs and Plants, some are good to eat Raw; as Lettuce, Endive, Purlflane, Tarragon, Crettes, Cucumbers, Musk-Melons, Radish, &c. Others only after they are boiled, or have passed the Fire; as Parsley, Clary, Sage, Parsnips, Turnips, Alsparagus, Artichoaks, (though they also being young are eaten raw.) But a number of Herbs are not efficuent at all; as Wormwood, Gras, Green-Corn, Centory, Hyssop, Lavender, Balm, &c. The causes are, for that the Herbs that are not efficuent, do want the two tastes, in which nourishment refleth; which are fat and sweet, and have (contrariwise) bitter and over-strong tastes, or a juice too crude, as cannot be ripened to the degree of Nourishment, Herbs, and Plants, that are Efficuent raw, have fatness, or sweetness (as all Efficuent Fruits) such are Onions, Lettuce, &c. But then it must be such a fatness (for as for sweet things, they are in effect always efficuent) as is not over-grofs, as loading of the Stomack; for Parsnips and Leeks have fatness; but it is too grofs and heavy without boiling. It must be also in a substance somewhat tender, for we see Wheat, Barley, Artichoaks are no good Nourishment, till they have passed the Fire; but the Fire doth ripen, and makest them soft and tender, and so they become efficuent. As for Radishes, and Tarragon, and the like, they are for Condiments, and not for Nourishment; and even some of those Herbs, which are not
not esculent, are not withstanding poculent; as Hops, Broom, &c. Quere, what Herbs are good for Drink, besides the two aforesaid; for that it may (perhaps) ease the charge of Brewing, if they make Beer to require less Male, or make it last longer.

Parts fit for the nourishment of Man in Plants, are Seeds, Roots, and Fruits; but chiefly Seeds and Roots. For Leaves, they give no nourishment at all, or very little; no more do Flowers, or Blossoms, or Stalks. The reason is, for that Roots, and Seeds, and Fruits, (in as much as all Plants consist of an Oyly, and Watry substantive commixed) have more of the Oyly substantive, and Leaves, Flowers, &c. of the Watry. And secondly, they are more concocted, for the Root, which continueth ever in the Earth, is still concocted by the Earth; and Fruits and Grains (we see) are half a year, or more in concocting; whereas Leaves are out, and perfect in a Moneth.

Plants (for the most part) are more strong, both in taste and smell in the Seed, than in the Leaf and Root. The caufe is, for that in Plants that are not of a fierce and eager spirit, the vertue is increas’d by Concoction and Maturatio, which is ever most in the Seed; but in Plants that are of a fierce and eager spirit, they are stronger whilest the spirit is inclin’d in the Root; and the spirits do but weaken and dissipate, when they come to the Air and Sun; as we see in Onions, Carriick, Dragon &c. Nay, there be Plants that have their Roots very hot and aromaticall, and their Seeds rather infipid as Ginger. The caufe is (as was touched before) for that the heat of those Plants is very dissipable; which under the Earth is contained and held in, but when it cometh to the Air, it exhaleth.

The Juices of Fruits, are either Watry or Oyly. I reckon amongst the Watry, all the Fruits, out of which, Drink is expresse’d; as the Grape, the Apple, the Peer, the Cherry, the Pomegranate, &c. And there are some others, which though they be not in use for Drink, yet they appear to be of the same nature; as Plums, Services Mulberries, Rais, Gronee, Lemmons, &c. And for those Juices that are so fit for, as they cannot make Drink by Expression, yet perhaps they may make Drink by mixture of Water.

Poucaque admissis imitantur vites Sorbies.

And it may be Hops and Brier-Berries would do the like. Those that have Oyly Juices, are Olives, Almonds, Nuts of all sorts, Pine-Apples, &c. and their Juices are all inflammable. And you must observe also, that some of the Watry Juices, after they have gathered spirit, will burn and enflame, as Wine. There is a third kind of Fruit that is sweet, without either sharpnes or oylines; such as is the Fig and the Date.

It hath been noted, that most Trees, and especially those that bear Mofh, are fruitful but once in two years. The caufe, no doubt, is the expence of Sap; for many Orchard Trees well cultured, will bear divers years togeth.

There is no Tree, which besides the Natural Fruit, doth bear so many Baffard Fruits as the Oak doth; for besides the Acorn, it beareth Galls, Oak-Apples, and certain Oak-Nuts, which are inflammable; and certain Oak-Berries sticking close to the Body of the Tree without Stalk. It beareth also Mistletoe, though sisterly. The caufe of all these may be, the clofenes, and folidenes of the Wood, and Pithe of the Oak; which maketh several Juices finde several Eruptions. And therefore, if you will devise to make any Super-Plants, you must ever give the Sap plentiful rising, and hard issue.

There
There are two Excrefences which grow upon Trees, both of them in the nature of_Mushromes_; the one the Romans called _Boletus_, which groweth upon the Roots of Oaks, and was one of the dainties of their Table: The other is _Medicinal_, that is called _Agarick_ (whereof we have spoken before) which groweth upon the tops of Oaks; though it be affirmed by some, that it groweth also at the Roots. I do conceive, that many Excrefences of Trees grow chiefly, where the Tree is dead or faded; for that the Natural Sap of the Tree, corrupteth into some Preternatural Substan-

The greater part of Trees bear most, and best on the lower Boughs; as _Oaks, Figs, Walnuts, Pears, &c._ But some bear best on the top Boughs, as _Crabs, &c._ Those that bear best below, are such, as shade doth more good to than hurt: For generally all Fruits bear best low, because the _Sip_ creep, not having but a short way. And therefore in Fruits sired upon Walls, the low are the greatest, as was formerly said: _So it is_, the shade that hindereth the lower Boughs, except it be in such Trees as delight in shade, or at least bear it well. And therefore they are either strong Trees, as the Oak, or else they have large Leaves, as the _Walnut_ and Fig, or else they grow in _Pyramids_ as the _Pear_. But if they require very much Sun, they bear best on the top; as it is Crabs, Apples, Plumbs, &c.

There be Trees that bear best when they begin to be old; as _Almonds, Pears, Vines_, and all Trees that give _Ma$_. The cause is, for that all Trees that bear Ma$ have an oyle Fruit; and young Trees have a more watry _Juice_, and lets concocted; and of the same kinde also is the _Almond_. The _Pear_ likewife though it be not oyle, yet it requirith much _Sip_, and well concocted; for we see it is a heavy Fruit and solid, much more than _Apples, Plumbs, &c._ As for the _Vine_, it is noted that it beareth more _Grapes_ when it is young; but _Grapes that make better Wine when it is old_, for that the _Juice_ is the better concocted: And we see, that _Wine_ is inflammable, so as it hath a kinde of oyliness. But the most part of _Trees_, amongst which are _Apples, Plumbs, &c._ bear best when they are young.

There be Plants that have a _Milk_ in them when they are cut; as _Figs, Old Lettuce, Sow-thistles, Spurge, &c._ The cause may be an Inception of _Putrefaction_: For _those Milks_ have all an _Acrimony_, though one would think they should be _Lenitive_. For if you write upon Paper with the _Milk_ of the _Fig_, the Letters will not be seen, until you hold the Paper before the fire, and then they wax brown; which sheweth, that it is a sharp or fretting _Juice_. _Lettuce_ is thought poysonous, when it is to old as to have _Milk_: _Spurge_ is a kinde of _poyson_ in itself; and as for _Sow-thistles_, though _Coneys_ eat them, yet _Sheep_ and _Cattel_ will not touch them; and besides, the _Milk_ of them, rubbed upon _Warts_, in short time weareth them away: Which sheweth the _Milk_ of them to be _Corrosive_. We see also, that _Wheat_ and other _Corn_ insoln, if you take them forth of the _Ground_, before they sprout, are full of _Milk_; and the beginning of _Germination_ is ever a kinde of _Putrefaction_ of the _Seed_. _Euphorbium_ also hath a _Milk_, though not very white, which is of a great _Acrimony_. And _Saladine_ hath a yellow _Milk_, which hath likewise much _Acrimony_, for it cleanseth the _Eyes_; it is good also for _Catarrhs_.

_Mushromes_ are reported to grow, as well upon the Bodies of _Trees_, as upon their _Roots_, or upon the _Earth_, and especially upon the _Oak_. The cause is, for that strong _Trees_ are towards such _Excrefences_ in the nature of _Earth_, and therefore put forth _Ma$, Mushromes_, and the like.

The
There is hardly found a Plant that yieldeth a red Juyce in the Blade or Ear, except it be the Tree that bearth Sangiu Dracon; which groweth chiefly in the Island Sogossa: The Herb Aramanthum (indeed) is red all over; and Brass is red in the Wood, and so is Red Sanders. The Tree of Sangiu Dracon growth in the form of a Sugar-Loaf; it is like the Sap of that Plant concocteth in the Body of the Tree. For we see, that Grapes and Pomegranates are red in the Juyce, but are Green in the Tear. And this maketh the Tree of Sangiu Dracon leffer towards the top, because the Juyce hardeneth not up; and besides, it is very Astringent, and therefore of slow motion.

It is reported, that Sweet Moss, besides that upon the Apple-trees, growth like-wise (sometimes) upon Poplars, and yet (generally) the Poplar is a smooth Tree of Bark, and hath little Moss. The Moss of the Larix-tree burneth also sweet, and sparkleth in the burning. Quære, of the Mosses of Odorate Trees; as Cedar, Cypress, Lignum, Aloes &c.

The Death, that is most without pain, hath been noted to be upon the taking of the Potion of Hemlock; which in Humanity was the form of execution of capital offenders in Athens. The Poison of the Asp, that Cleopatra used, hath some affinity with it. The cause is, for that the torment of Death are chiefly raiied by the strive of the Spirits; and these Vapors quench the Spirits by degrees; like to the death of an extreme old Man. I conceive it is less painful then Opium, because Opium hath parts of heat mixed.

There be Fruits that are sweet before they ripen, as Mirabolanes; so Fennel-feeds are sweet before they ripen, and after grow spicè; and sone never ripen to be sweet; as Tamarinds, Barberries, Crabs, Sloes, &c. The cause is, for that the former kinds have much and subtle heat, which causeth early sweetnes; the latter have a cold and acide Juyce, which no heat of the Sun can sweeten. But as for the Mirabolane, it hath parts of contrary natures, for it is sweet and astringent.

There be few Herbs that have a Salt taste; and contrariwise, all Blood of Living Creatures hath a saltiness; the cause may be, for that Salt, though it be the Rudiment of Life, yet in Plants the original taste remaineth not; for you shall have them bitter, sour, sweet, biting, but seldom salt: But in Living Creatures, all those high tastes may happen to be (sometimes) in the humors, but are seldom in the flesh, or sub stance; because it is of a more oily Nature, which is not very susceptible of those tastes; and the saltiness itself of Blood, is but a light and secret saltiness: And even among Plants, some do participate of saltiness, as Alga Marina, Samphire, Scowry Grass, &c. And they report there is in some of the Indian Seas, a Swimming Plant, which they call Salguzus, spreding over the Sea, in fort, as one would think it were a Meadow. It is certain, that out of the Ashes of all Plants, they extract a Salt which they use in Medicines.

It is reported by one of the Ancients, that there is an Herb, growing in the Water, called Limcofts, which is full of Prickles: This Herb putth forth another small Herb out of the Leaf, which is imputed to some moisture, that is gathered between the Prickles, which putrid by the Sun, germinareth. But I remember also, I have seen, for a great rarity, one Rose grow out of another, like Honey-Suckles, that they call Top and Top-gallants.

Barley (as appeareth in the Malting) being steeped in Water three days, and afterwards the Water drained from it, and the Barley turned upon a dry Floar, will sprout half an inch long, at least: And if it be let alone, and
not turned, much more, until the heart be out. What will do the same; try it also with Pease and Beans. This Experiment is not like that of the Orpin and Semper-ive; for there it is of the old store, for no Water is added, but here it is nourished from the Water. The Experiment would be further driven; for it appeareth already, by that which hath been said, that Earth is not necessary to the first sprouting of Plants, and we see, that Rose-Buds set in Water, will blow: Therefore try whether the Sprouts of such Grains may not be raised to a further degree, as to an Herb or Flower, with Water only, or some small commixture of Earth: For if they will, it should seem by the Experiments before, both of the Malt, and of the Ros, that they will come far fatter on in Water then in Earth; for the nourishment is earliest drawn out of Water then out of Earth. It may give some light also, that Drink infused with Fleth, as that with the Capon, &c. will nourish fatter and easlier, then Meatt and Drink together. Try the same Experiment with Roots, as well as with Grains. As for example, take a Turnip and keep it a while, and then dry it, and see whether it will sprout.

Malt in the Drenching will swell, and that in such a manner, as after the putting forth in sprouts, and the drying upon the Kiln, there will be gained, at least, a Bushel in eight, and yet the sprouts are rubbed off, and there will be a Bushel of Duff besides the Malt; which I suppose to be, not onely by the loose and open laying of the Parts, but by some addition of substance drawn from the Water, in which it was steeped.

Malt gathereth a sweetness to the taste, which appeareth yet more in the Wort. The Dullcoration of things is worthy to be tried to the full; for that Dullcoration importeth a degree to nourishment. And the making of things inalimental to become alimental, may be an Experiment of great profit for making new victual.

Most Seeds in the growing, leave their Husk or Rind about the Root; but the Onion will carry it up, that it will be like a cap upon the top of the young Onion. The cause may be, for that the Skin or Husk is not ease to break; as we see by the pilling of Onions, what a holding substance the Skin is.

Plants that have curled Leaves, do all abound with moisture, which cometh so fast on, as they cannot spread themselves plain, but must needs gather together. The weakest kinds of curling is rouine, as in Clary and Bnr. The second is, curling on the sides; as in Lettuce and young Cabbage. And the third is, folding into an Head, as in Cabbage full grown, and Cabbage Lettuce.

It is reported, that Firr and Pine, especially if they be old and putresfied, though they shine not as some rotten Woods do, yet in the sudden breaking they will sparkle like hard Sugar.

The Roots of Trees do (some of them) put downwards deep into the Ground; as the Oak, Pine, Firr, &e. Some spread more towards the Surface of the Earth; as the Ash, Cypress-tree, Olive, &c. The cause of this latter may be, for that such Trees as love the Sun, do not willingly descend far into the Earth; and therefore they are (commonly) Trees that shoot up much; for in their Body their desire of approach to the Sun maketh them spread the Ies. And the same reason, under Ground, to avoid recells from the Sun, maketh them spread the more. And we see it cometh to pass in some Trees which have been planted to deep in the Ground, that for love of approach to the Sun, they forsake their first Root, and put out another more towards the top of the Earth. And we see also, that...
the Olive is full of Oily Juyce, and Ash maketh the best Fire, and Cypres is an hot Tree. As for the Oak, which is of the former sort, it loveth the Earth, and therefore groweth slowly. And for the Pine, and Firr likewise, they have so much heat in themselves, as they need let the heat of the Sun. There be Herbs also, that have the same difference; as the Herb they call \textit{Mordus Diaboli}, which putteth the Root down so low. as you cannot pull it up without breaking; which gave occasion to the name and fable, for that it was said it was so wholesome a Root, \textit{That the Devil when it was gathered, bit it for envy}. And some of the \textit{Ancients} do report, that there was a goodly Firr (which they desired to remove whole) that had a Root under ground eight cubits deep, and to the Root came up broken.

It hath been observed, that a Branch of a Tree being unbarked some space at the bottom, and so set into the Ground, hath grown even of such Trees, as if the Branch were let with the Bark on, they would not grow; yet contrariwise we see, that a Tree pared round in the Body above Ground will die. The cause may be, for that the unbarkt part draweth the nourishment best, but the Bark continueth it only.

Grapes will continue fresh and moist all Winter long, if you hang them cluster by cluster in the Roof of a warm Room, especially, if when you gather the cluster, you take off with the cluster some of the Stock.

The Reed or Cane is a warry Plant, and groweth nor but in the Winter. It hath these properties, That it is hollow, that it is knuckled, both Stalk and Root, that being dry it is more hard and fragile then other Wood, that it putteth forth no Boughs, though many Stalks out of one Root. It diffeth much in greatness, the smallest being fit for thatching of Houses, and stopping the chinks of Ships better then Glew or Pitch. The second bigness is used for Angle rods and Staves, and in China for beating of offenders upon the Thighs. The differing kindes of them are, the common Reed, the \textit{Cassia Fistula}, and the Sugar-Reed. Of all Plants it boweth the easiest, and rifeth again. 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 Bark, and the hollowest in Body.

The Sap of Trees, when they are let Blood, is of differing Natures. Some more watry and clear, as that of Vines, of Beeches, of Pears; some thick, as Apples; some Gummy, as Cherries; some frothy, as Elms; some milky, as Figs. In Mulberries, the Sap seemeth to be (almost) towards the Bark only; for if you cut the Tree a little into the Bark with a Stone, it will come forth, if you pierce it deeper with a tool, it will bedry. The Trees which have the moistest Juyces in their Fruit, have commonly the moistest Sap in their Body; for the Vines and Pears are very moist, Apples somewhat more pouncy: the Milk of the Fig hath the quality of the Rennet, to gather Cheefe, and so have certain four Herbs wherewith they make Cheefe in Lent.

The Timber and Wood are in some Trees more clean, in some more knotty; and it is a good tryal, to try it by speaking at one end, and laying the Ear at the other: For if it be knotty, the voice will not pass well. Some have the Veins more varied and Chamlioted; as Oak, whereof Wainscot is made; Maple, whereof Trenchers are made: Some more smooth, as Firr and Walnus; some do more easil grow Worms and Spiders; some more hardly, as it is said of Irish Trees. Besides, there be a number of differences
As Cypress, their time ranmes, some fickle, the some well the is alone; hundred tough, with and Fuel, Rivers time however some are of for plenty, as Malts of Ships, as Firr and Pine, because of their length, straightness, and lightness; some for Pale, as Oak; some for Fuel, as Ash: And so of the rest.

The coming of Trees and Plants in certain Regions, and not in others, is sometimes casual; for many have been translated, and have prospered well; as Damascus Roses, that have not been known in England above an hundred years, and now are so common. But the liking of Plants in certain Soyls more then in others, is meerly Natural; as the Firr and Pine love the Mountains; the Poplar, Willow, Sallow, and Alder, love Rivers and moist places; the Ash loveth Coppices, but is best in Standards alone: Juniper loveth Chalk, and so do most Fruit-trees; Sampire groweth but upon Rocks; Reeds and Osiers grow where they are washed with Winter; the Vine loveth sides of Hills turning upon the South-East Sun, &c.

The putting forth of certain Herbs, discovereth of what nature the Ground where they put forth is; as wilde Thyme theweth good Feeding Ground for Cattle; Betony and Strawberries thew Grounds fit for Wood; Camomile theweth mellow Grounds fit for Wheat; Mustard-feed growing after the Plough, theweth a good strong Ground also for Wheat; Burnet theweth good Meadow, and the like.

There are found in divers Countreyes, some other Plants that grow out of Trees and Plants, besides Mistletoe: As in Syria there is an Herb called Cassia, that groweth out of tall Trees, and windeth in self about the same Tree where it groweth, and sometimes about Thorns. There is a kinde of Polypode that groweth out of Tree, though it windeth not. So likewise an Herb called Famos upon the Wilde Olive; and an Herb called Hippophae upon the Fuller's Thorn, which, they say, is good for the Falling-ficknes.

It hath been observed by some of the Ancients, that howsoever cold and bitterer winds are thought to be great enemies to Fruit, yet nevertheless South-winds are also found to do hurt, especially in the Blossoming time, and the more, if Showers follow. It seemeth they call forth the moisture too fast. The West winds are the best. It hath been observed also, that green and open Winters do hurt Trees, insomuch as if two or three such Winters come together, Almond-Trees, and some other Trees will die: The cause is the same with the former, because the Luft of the Earth overspended it self; howsoever some other of the Ancients have commended warm Winters.

Snows lying long cause a fruitful year. For first, they keep in the strength of the Earth: Secondly, they water the Earth better then Rain: for in Snow the Earth doth (as it were) suck the Water asout of the Tear; Thirdly, the moisture of Snow is the finest moisture, for it is the Froth of the Cloudy Waters.

Showers, if they come a little before the ripening of Fruits, do good to all succulent and moist Fruits, as Vines, Olives, Pomegranates; yet it is rather for plenty then for goodnes, for the best Wines are in the dryest Vintages.
Small flowers are likewise good for Corn, to as parching hear's come not upon them. Generally, Night-showeres are better then Day showeres; for that the Sun followeth not to fall upon them: And we see, even in watering by the Hand, it is best in Summer time to water in the Evening.

The differences of Earths, and the tryals of them, are worthy to be diligently enquired. The Earth that with showeres doth easily senke, is commended; and yet some Earth of that kinde will be very dry and hard before the showeres. The Earth that casteth up from the Plough a great cloud, is not so good as that which casteth up a smaller cloud. The Earth that puteth forth Mould easily, and may be called Mouldy, is not good. The Earth that smelleth well upon the Digging, or Ploughing, is commended; as containing the Juice of Vegetables almost already prepared. It is thought by some, that the ends of low Rain-bows fall more upon one kinde of Earth then upon another: As it may well be, for that Earth is most receiv'd; and therefore it is commended for a sign of a good Earth. The poornesse of the Herbs (it is plain); streweth the poorerels of the Earth, and especially, if they be in colour more dark: But if the Herbs strew wither'd or blasted at the top, it streweth the Earth to be very cold; and so doth the Mould of Trees. The Earth whereof the Grass is soon parched with the Sun and toasted, is commonly forced Earth, and barren in his own nature. The tender, chaffon, and mellow Earth is the best; being meer Mould, between the two extreames of Clay and Sand, especially, if it be not Loamy and Binding. The Earth that after Rain will scarce be Ploughed, is commonly fruitful; for it is cleaving, and full of Juice.

It is strange, which is observed by some of the Ancients, that Dust helps the fruitfulnes of Trees, and of Vines by name; insomuch, as they call Dust upon them of purpose. It should seem that that powdering, when a shower cometh, maketh a kinde of toyling to the Tree, being Earth and Water finely laid on. And they note, that Countries where the Fields and Ways are dusty, bear the best Vines.

It is commended by the Ancients for an excellent help to Trees, to lay the Racks and Leaves of Lupines about the Roots, or to Plough them into the Ground, where you will sow Corn. The burning alfo of the cuttings of Vines, and calling them upon Land, doth much good. And it was generally received of old, that duning of Grounds when the West-wind bloweth, and in the decrease of the Moon, doth greatly help the Earth (as it seemeth) being then more thirsty, and open to receive the Dung.

The Grafting of Vines upon Vines (as I take it) is now in use. The Ancients had it, and that three ways; the first was Infection, which is the ordinary manner of Grafting: The second was Terebration, through the middle of the Stock, and putting in the Cions there: And the third was Paring of two Vines that grow together to the Marrow, and binding them close.

The Diseases and ill Accidents of Corn, are worthy to be enquired, and would be more worthy to be enquired, if it were in Mens power to help them: whereas many of them are not to be remedied. The Mildew is one of the greatest, which (out of question) cometh by cloeness of Air; and therefore in Hills, or Large Champain Grounds, it seldom cometh; such as is with us York's Woold. This cannot be remedied, otherwise then that in Countries of small enolosure the Grounds be turned into larger Fields; Which I have known to do good in some Farms. Another
Another Diſeafe is the putting forth of Wild Oats, whereinto Corn ofte-
times (especially Barley) doth degenerate. It haphne thicke from the
weaknes of the Graine that is sown; for if it be either too old or mouldy,
it will bring forth wilde Oats. Another diſeaf is the varietie of the
Ground; for if you sow one Ground full with the fame Corn (I mean not
the fame Corn that grew upon the fame Ground, but the fame kinde of
Grain, as Wheat, Barley, &c.) it will prosper but poorly; therefore be-
ides the reaping of the Ground, you must vary the Seed. Another ill Acciden-
t is from the Winds, which hurt at two times; at the flowing by shaking of
the Flowers, and at the full ripening by shaking out the Corn. Another ill Acciden-
t is Drought at the spindling of the Corn, which with us is rare, but in
hotter Countreys common, in somuch as the word Calamitas was first
derived from Calamus, when the Corn could not get out of the flake.
Another ill Accident is Over-wet at sowing time, which with us breedeth
much Dearth. infomuch as the Corn never cometh up; and (many times)
they are forced to re-sow Summer-Corn, where they sowed Winter-Corn.
Another ill Accident is bitter Frosts, continued without Snow, especially in
the beginning of the Winter, after the Seed is new sown. Another Diſeafe
is Worms, which sometimes breed in the Root, and happen upon hot Suns
and flowers immediately after the sowing; and another Worm breedeth in the
the Bar it self, especially when hot Suns break often out of Clouds. An-
other Diſeafe is Weeds; and they are such, as either choak and over-shadow
the Corn, and bear it down, or starve the Corn, and deceive it of nourish-
ment. Another Diſeafe is, over-rankneſs of the Corn, which they use to
remedy by Mowing it after it is come up, or putting Sheep into it. An-
other ill Accident is, laying of Corn with great Rains near or in Harvest.
Another ill Accident is, if the Seed happen to have touched Oyl, or any
thing that is fat; for these substances have an antipathy with nourishment of
Water.

The remedies of the Diseases of Corn have been observed as followeth.
The Steeping of the Grain before Sowing, a little time in Wine, is thought a
preervative; the Mingling of Seed-Corn with Aﬄes, is thought to be good;
the Sowing at the wine of the Moon, is thought to make the Corn found.
It hath not been practised, but it is thought to be of use to make some Musell-
lane in Corn; as if you sow a few Beans with Wheat, your Wheat will be the
better. It hath been observed, that the sowing of Corn with Houleek doth
good. Though Grain that toucheth Oyl or Fat receiveth hurt, yet the
steeping of it in the Dregs of Oyl, when it beginneth to putrefie, (which they
call Amurea) is thought to assure it against Worms. It is reported also, that
if Corn be moved, it will make the Grain longer, but emptier, and having
more of the Husk.

It hath been noted, that Seed of a year old is the best; and of two or
three years is worse; and that which is more old is quite barren, though
(no doubt) some Seed and Grain laft better then others. The Corn
which in the Vanning lieth lowest is the best; and the Corn which broken
or broken, retaineth a little yellowness, is better then that which is very
white.

It hath been observed, that of all Roots of Herbs, the Root of Sorrel
goeth the furthest into the Earth, infomuch as it hath been known to go three
cubits deep; and that it is the Root that continueth fir (longest) to be fet
again, of any Root that growtheth. It is a cold and acide Herb, that (as it feem-
eth) loveth the Earth, and is not much drawn by the Sun.
Natural History;

673. It hath been observed, that some Herbs like bell being watered with Salt-water, as Radishes, Beets, Rue, Penny royal. This trial 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 it is generally received, how some poisonous Beasts affect odorate and wholfoe Herbs; as, that the Snaky loveth Fennel, that the Toad will be much under Sage, that Frogs will be in Cinquefoil. It may be it is rather the Shade, or other Coverture, that they take liking in, then the virtue of the Herb.

675. It were a matter of great profit, (five that I doubt it is too conjectural to venture upon) if one could discern what Corn, Herbs, or Fruits, are like to be in Plenty or Scarcity, by some Signs and Prognosticks in the beginning of the year: For as for those that are like to be in Plenty, they may be bargained for upon the Ground; as the old relation was of Thales, who to shew how easy it was for a Philosopher to be rich, when he forecast a great plenty of Olives, made a Monopoly of them. And for Scarcity, Men may make profit in keeping better the old store. Long continuance of Snow is believed to make a fruitful year of Corn; an early Winter, or a very late Winter, a barren year of Corn; an open and serene Winter, an ill year of Fruit. These we have partly touched before; but other Prognosticks of like nature are diligently to be enquired.

There seem to be in some Plants singularities, wherein they differ from all other. The Olive hath the only part only on the outside, whereas all other Fruits have it in the Nut or Kernel. The Firr hath (in effect) no Stone, Nut, nor Kernel; except you will count the little Grains, Kernels. The Pomegranate and Pine-Apple have only, amongst Fruits, Grains, distinct in several Cells. No Herbs have cuted Leaves, but Cabbage and Cabbage-Lettuce. None have double Leaves, one belonging to the Stalk, another to the Fruit or Seed, but the Artichoke. No Flower hath that kind of spred that the Wood-bine hath. This may be a large Field of Contemplation; for it sheweth, that in the Frame of Nature there is, in the producing of some Species, a composition of Matter, which happeneth oft, and may be much diversified; in others, such as happeneth rarely, and admitteth little variety. For so it is likewise in Beasts; Dogs have a resemblance with Wolves and Foxes, Horses with Asses, Kine with Bulses, Hares with Conyes, &c. And so in Birds; Kites and Kestrels have a resemblance with Hawks; Common Doves with Ring-Doves and Turtles; Black-Birds with Thrushes and Mavisles; Crows with Ravens, Daws, and Choughs, &c. But Elephants and Swine amongst Beasts, and the Bird of Paradise, and the Peacock amongst Birds, and some few others, have scarce any other Species that have affinity with them.

We leave the Description of Plants and their Virtues to Herbs, and other like Books of Natural History, wherein Mens diligence hath been great, even to Curiosity. For our Experiments are only such, as do ever ascend a degree to the deriving of Causes, and extracting of Axioms, which we are not ignorant, but that some, both of the Ancients and Modern Writers have also labored; but their Causes and Axioms are so full of Imagination, and so infected with the old received Theories, as they are meer Inquisitions of Experience, and concoct it not.

It hath been observed by some of the Ancients, that Skins, especially of Rams newly pulled off, and applied to the Wounds of Stripes, do keep them from swelling and exulcerating, and likewise heal them, and close them up; and that the Whites of Eggs do the same. The cause is, temperate Conglutination; for both Bodies are clammy and viscous, and do bridge the Delux of Humors to the hurts, without penning them in too much.

You may turn (almost) all Flesh into a fatty sub stance; if you take Flesh and cut it into pieces, and put the pieces into a Glass covered with Parchment, and so let the Glass stand six or seven hours in boiling Water. It may be an experiment of profit, for making of Fat or Grease for many u ses: But then it must be of such Flesh as is not edible; as Horses, Dogs, Bears, Foxes, Badgers, &c.

It is reported by one of the Ancients, that new Wine put into Vessels well stop ped, and the Vessels let down into the Sea, will accelerate very much the making of them ripe and potables the same would be tryed in Wort.

Beasts are more Hairy than Men; and Savage Men more than Civil; and the Plumage of Birds exceedeth the Pilosity of Beasts. The cause of the smoothness in Men, is not only abundance of Heat and Moiture, though that indeed causeth Pilosity; but there is requisite to Pilosity, not so much Heat and Moiture, as Excrementitious Heat and Moiture; (for whatsoever assimilate goeth not into the Hair) and Excrementitious Moiture aboundeth most in Beasts, and Men that are more savage. Much the same Reason is there of the Plumage of Birds; for Birds assimilate less, and excrete more then Beasts, for their Excrements are ever aquid, and their Flesh (generally) more dry; beside, they have not Instruments for Urine, and so all the Excrementitious Moiture goeth into the Feathers: And therefore it is no marvel though Birds be commonly better Meat then Beasts, because their flesh doth assimilate more finely, and se-cerneth more subtilely. Again, the Head of Man hath Hair upon the first Birth, which no other part of the Body hath. The cause may be want of Perpiration; for much of the matter of Hair, in the other parts of the Body goeth forth by insensible Perpiration. And besides, the Skull being of a more solid substance, nourisheth and assimilateth less, and excreteth more; and so likewise doth the Chin. We see also that Hair cometh not upon the Palms of the Hands, nor Soles of the Feet, which are parts more peripatible. And Children like wise are not Hairy, for that their Skins are more peripatible.

Birds are of swifter motion then Beasts; for the flight of many Birds is swifter then the race of any Beasts. The cause is, for that the Spirits in Birds are in greater proportion, in comparison of the bulk of their Body, then in Beasts. For as for the reason that some give, that they are partly carried, whereas Beasts go, that is nothing; by that reason, swimming should be swifter then running: And that kinde of carriage also, is not without labor of the Wing.
The Sea is clearer when the North-wind bloweth, then when the South-wind. The cause, is, for that Salt-water hath a little Olyness in the Surface thereof, as appeareth in very hot days: And again, for that the Southern-wind relaxeth the Water somewhat; as no Water boiling, is so clear as cold Water.

The bottom of a Vessel of boiling Water (as hath been observed) is not very much heated, so as men may put their hand under the Vessel, and remove it. The cause is, for that the moisture of Water, as it quencheth Coals where it entareth, so it doth allay heat where it toucheth. And therefore note well, that moisture, although it doth not pass through Bodies without Communication of some subsistence (as heat and cold do) yet it worketh manifest effects; nor by entrance of the Body, but by qualifying of the heat and cold, as we see in this instance. And we see likewise, that the water of things distilled in water, (which they call the Bath) differeth not much from the water of things distilled by Fire. We see also, that Pewter-Dishes with Water in them will not melt easily, but without it they will. Nay, we see more, that Butter or Oyl, which in themselves are inflammable, yet by the virtue of their moisture will do the like.

It hath been noted by the Ancients, that it is dangerous to pick ones Ear whilst he Yawneth. The cause is, for that in Yawning, the inner Parchment of the Ear is extended by the drawing in of the Spirit and Breath; for in Yawning and Sighing both, the Spirit is first strongly drawn in, and then strongly expelled.

It hath been observed by the Ancients, that Sneezing doth cease the Hic-cough. The cause, is, for that the Motion of the Hic-cough is a lifting up of the Stomach; which Sneezing doth somewhat depress, and divert the motion on another way. For first, we see that the Hic-cough cometh of fulness of Meat, (especially in Children) which causeth an extension of the Stomach: We see also, it is causeth by acide Meats or Drinks, which is by the prickling of the Stomach. And this motion is ceased, either by Diversion, or by Detention of the Spirits: Diversion, as in Sneezing; Detention, as we see holding of the Breath doth help somewhat to cease the Hic-cough, and putting a Man into an earnest Study doth the like, as is commonly used: And Vinegar put to the Nose, or Gargarized doth it also; for that it is Anstringent, and inhibiteth the motion of the Spirit.
Looking against the Sun doth induce Sneezing. The cause is, not the heating of the Nostrils; for then the holding up of the Nostrils against the Sun, the ugh one wink, would do it, but the drawing down of the moisture of the Brain: For it will make the Eyes run with water, and the drawing of moisture to the Eyes, doth draw it to the Nostrils by Motion of Consent, and so followeth Sneezing. As contrariwise, the Tickling of the Nostrils within doth draw the moisture to the Nostrils, and to the Eyes by consent, for they also will water. But yet it hath been observed, that if one be about to sneeze, the rubbing of the Eyes till they run with water, will prevent it. Whereof the cause is, that the humour which was descending to the Nostrils, is diverted to the eyes.

The Teeth are more by cold drink, or the like, affected, then 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 becometh more eager. The other is, for that the Teeth are parts without Blood, whereas Blood helpeth to qualify the cold. And therefore we see, that the Sinews are much affected with Cold, for that they are parts without Blood. So the Bones in sharp Colds wax brittle; and therefore it hath been seen, that all contusions of Bones in hard weather, are more difficult to cure.

It hath been noted, that the Tongue receiveth more easily tokens of Diseases than the other parts; as of heats within, which appear most in the blackness of the Tongue. Again, Pied Cattle are spotted in their Tongues, &c. The cause is (no doubt) the tenderness of the part; which receiveth more easily all alterations then any other parts of the Flesh.

When the Mouth is out of use, it maketh things taste sometimes salt, chiefly bitter, and sometimes loathsome, but never sweet. The cause is, the corrupting of the moisture about the Tongue, which many times turneth bitter, and salt, and loathsome, but sweet never; for the salt are degrees of corruption.

It was observed in the Great Plague of the last year, that there were seen in divers Ditches, and low Grounds about London, many Toads that had Tails two or three inches long at the least, whereas Toads (usually) have no Tails at all: which argueth a great disposition to putrefaction in the Soil and Air. It is reported likewise, that Roots (such as Carrots and Parsnips) are more sweet and luscious in infectious years then in other years.

Physicians should with all diligence inquire what Simples Nature yieldeth, that have extreme subtle parts without any Mordication or Acrimony; for they undermine that which is hard, they open that which is stopped and shut, and they expel that which is offensive gently, without too much perturbation. Of this kinde are Elder-flowers, which therefore are proper for the Stone; of this kinde is the Downsbine, which is proper for the Jaundies; of this kinde is Maris-born, which is proper for Agues and Infections; of this kinde is Pinny, which is proper for Stoppings in the Head; of this kinde is Funitory which is proper for the Spleen;
and a number of others. Generally, divers Creatures bred of Putrefaction, though they be somewhat loathsome to take, are of this kinde; as Earthworms, Timber-worms, Snails, &c. And I conceive, that the Insects of Vipers, (as which are so much magnified) and the leech of Snakes some ways condensed and corrected (which of late are grown into some credit) are of the same nature. So the parts of Beasts putrefied (as Cadaverum and Musk, which have extream subtítle parts) are to be placed amongst them. We fee also, that Putrefaction of Plants (as Aegrisch and Fungi Ear) are of greatest vertue. The caufe is, for that Putrefaction is the subtilest of all motions in the parts of Bodies. And since we cannot take down the lives of Living Creatures (which some of the Paracelsians say, if they could be taken down, would make us Immortal,) the next is, for subtilty of operation to take Bodies putrefied, such as may be safely taken.

I t hath been observed by the Ancients, that much use of Venus doth dim the sight, and yet Eunuchs, which are unable to generate, are (nevertheles) also dim-sighted. The cause of dimnes of sight in the former, is the experience of Spirits; in the latter, the over-moifture of the Brain; for the over-moifture of the Brain doth thicken the Spirits visible, and obstructions 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 blindness cometh by Rheums and Cataracts. Now in Eunuchs there are all the notes of moifture; as the swelling of their Thighs, the loofness of their Belly, the smoothness of their skin, &c.

The pleasure in the Act of Venus, is the greatest of the pleasures of the Souls; the matching of it with Itch is improper, though that also be pleasing to the touch, but the causes are profound. First, all the Organs of the Senses qualify the motions of the Spirits, and make so many several species of motions, and pleasures or displeasures thereupon, as there be diversities of Organs. The Instruments of Sight, Hearing, Taste, and Smell, are of several frame, and are the parts for Generation; therefore Statiger doth well to make the pleasure of Generation a first Sense. And if there were any other differing Organs, and qualified Perforations for the Spirits to pass, there would be more then the Five Senses. Neither do we well know whether some Beasts and Birds have not Senses that we know not, and the very Sent of Dogs is almost a Sense by itself. Secondly, the Pleasures of the Touch are greater and deeper then those of the other Senses, as we see in Warming upon Cold, or Refrigeration upon Heat: For as the Pains of the Touch are greater then 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 vapors. For Smells, we see their great and sudden effect in fetching Men again when they are low; for Drink, it is certain, that the pleasure of Drunkenness is next the pleasure of Venus, and great Joys likewise make the Spirits move and touch themselves; and the pleasure of Venus is somewhat of the same kinde.

It hath been always observed, that Men are more inclined to Venus in the Winter, and Women in the Summer. The cause is, for that the Spirits in a body more hot and dry, (as the Spirits of Men are) by the Summer are more exhaled and dissipated, and in the Winter more condensed and kept entire; but in Bodies that are cold and moist (as Women are) the Summer doth
doth cherish the Spirits, and calleth them forth, the Winter doth dull them. Furthermore, the Abstinence or Intemperance of the use of Vomis, in moist and well habituate Bodies, breedeth a number of Diseases; and especially dangerous impollhumations. The reason is evident, for that it is a principal evacuation, especially of the Spirits; for of the Spirits, there is scarce any evacuation, but in Venus and exercise. And therefore the omission of either of them breedeth all diseases of Repletion.

The nature of Vivification is very worthy the enquiry; and as the Nature of things is commonly better perceived in small than in great, and in unperfect then in perfect, and in parts then in whole; so the Nature of Vivification is best enquired in Creatures bred of Putrefaction. The contemplation whereof hath many excellent Fruits. First, in disclosing the original of Vivification. Secondly, in disclosing the original of Figuration. Thirdly, in disclosing many things in the nature of perfect Creatures, which in them lie more hidden. And fourthly, in reducing by way of operation, some observations in the Insecta, to work effects upon perfect Creatures. Note, that the word Insecta agreeth not with the matter, but we ever use it for brevities fake, intending by it Creatures bred of Putrefaction.

The Insecta are found to breed out of several matters: Some breed of Mud or Dung; as the Earth-worms, Eels, Snakes, &c. For they are both Putrefactions: For Water in Mud do putrefie, as not able to preserve it self; and for Dung, all Excrements are the refuse and putrefactions of nourishment. Some breed in Wood, both growing and cut down. Quare, in what Woods moist, and at what seasons. We see that the Worms with many feet, which round themselves into Balls, are bred chiefly under Logs of Timber, but not in the Timber, and they are said to be found also (many times) in Gardens where no Logs are. But it seemeth their Generation requireth a coverture both from Sun, and Rain or Dew, as the Timber is; and therefore they are not venomous, but (contrariwise) are held by the Physicians to clarify the Blood. It is observed, that Cimices are found in the holes of Bed-Sides. Some breed in the Hair of Living Creatures; as Lice and Likes, which are bred by the sweat clofe kept, and somewhat affected by the Hair. The Excrements of Living Creatures do not only breed Insecta when they are excrent, but also while they are in the Body; as in Worms, whereunto Children are most subject, and are chiefly in the Guts. And it hath been lately observed by Physicians, that in many Pestilent Diseases there are Worms found in the upper parts of the Body, where Excrements are not, but only humors putrefied. Fleas breed principally of Straw or Mats, where there hath been a little moisture, or the Chamber and Bed-straw kept close, and not aired. It is received, that they are killed by burning Wormwood in the Rooms. And it is truly observed, that bitter things are apt rather to kill then engender Putrefaction, and they be things that are hot or sweet that are apt to putrefie. There is a Worm that breedeth in Meal of the shape of a large white Maggot, which is given as a great dainty to Nightingales. The Moth breedeth upon Cloth, and other Lanifices, especially if they be laid up dankish and wet. It delighteth to be about the flame of a Candle. There is a Worm called a Vevil, bred under Ground, and that feedeth upon Roots, as Parsnips, Carrots, &c. Some breed in Waters, especially shaded, but they must be by standing Waters; as the Water-Spider that hath six Legs. The Fly called the Gad fly breedeth of somewhat that swimeth upon the top of the Water, and
is most about Ponds. There is a Worm that breedeth of the Dregs of Wine decayed, which afterwards (as is observed by some of the Ancients) turneth into a Gnat. It hath been observed by the Ancients, that there is a Worm that breedeth in old Snow, and is of colour reddish and dull of motion, and dieth soon after it cometh out of Snow; which should shew that Snow hath in it a secret warmth, for else it could hardly vivifie. And therefore of the dying of the Worm may be the sudden exhaling of that little Spirit, as soon as it cometh out of the cold, which had shut it in. For as Butter-flies quicken with heat, which were benumbed with cold; so Spirits may exhale with heat, which were preserved in cold. It is affirmed, both by the Ancient and Modern observation, that in Furnaces of Copper and Brass, where Chalcites is (which is Vitrail) often cast in to mend the working, there riseth suddenly a Fly which sometimes moveth, as if it took hold on the Walls of the Furnace; sometimes is seen moving in the fire below, and dieth presently as soon as it is out of the Furnace. Which is a noble instance, and worthy to be weighed; for it sheweth that as well violent heat of fire, as the gentle heat of Living Creatures will vivifie, if it have matter proportionable. Now the great axiom of Vivification is, that there must be heat to dilate the Spirit of the Body, an Active 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 soon as ever it cooleth never so little, congealeth presently. And (no doubt) this action is furthered by the Chalcites, which hath a Spirit that will put forth and germinate, as we see in Chymical Trials. Briefly, most things purifed bring forth Insects of several names, but we will not take upon us now to enumerate them all.

The Insects have been noted by the Ancients to feed little: But this hath not been diligently observed; for Gashoppers eat up the Green of whole Countries, and Silk-worms devour Leaves twitly, and Ants make great provision. It is true, that Creatures that sleep and rest much, eat little, as Dormice and Bats, &c. they are all without Blood; which may be, for that the Juice of their Bodies is almost all one; not Blood, and Flesh, and Skin, and Bone, as in perfect Creatures: The integral parts have extream variety, but the similiar parts little. It is true, that they have (some of them) Diaphragm, and an Intestine; and they have all Skins, which in most of the Insects, are cast often. They are not (generally) of long life; yet Bees have been known to live seven years; and Snakes are thought, the rather for the eating of their spoil, to live till they be old; and Eels, which many times breed of putrefaction, will live and grow very long, and those that inter-change from Worms to Flies in the Summer, and from Flies to Worms in the Winter, have been kept in Boxes four years at the least; yet there are certain Flies that are called Ephemerata that live but a day. The caufe is, the exiliy of the Spirit, or perhaps the absence of the Sun; for that if they were brought in, or kept close, they might live longer. Many of the Insects (as Butter-flies and other Flies) revive causlly, when they seem dead, being brought to the Sun or Fire. The caufe whereof is, the diffusion of the Vital Spirit, and the caeli dilating of it by a little heat. They fir a good while after their heads are off, or that they be cut in pieces; which is caused also, for that their Vital Spirits are more diffused throughout all their parts, and let not confined to Organs then in perfect Creatures.

The Insects have voluntary Motion, and therefore imagination. And whereas some of the Ancients have said, that their Motion is indeterminate, and their imagination indefinite, it is negligently observed; for Ants go right forwards.
forwards to their Hills: and Bees do (admirably) know the way from a Flourney Heath, two or three miles off to their Hives. It may be Gnats and Flies have their Imagination more mutable and giddy, as small Birds like-wise have. It is said by some of the Ancients, that they have only the Sense of Feeling, which is manifestly untrue: for if they go forth right to a place, they must needs have Sights: Besides, they delight more in one Flower or Herb, then in another, and therefore have taste. And Bees are called with found upon Brafs, and therefore they have hearing. Which sheweth like-wise, that though their Spirits be diffused, yet there is a Seat of their Senses in their Head.

Other observations concerning the Insects, together with the Enumeration of them, we refer to that place where we mean to handle the Title of Animals in general.

A Man leaps better with weights in his hands, then without. The cause is, for that the weight (if it be proportionable) strengtheneth the Sine-news, by contracting them; for otherwise, where no contraction is needful, weight hindreth. As we see in Horse Races. Men are cutious to foresee that there be not the least weight upon the one Horse more then upon the other. In Leaping with Weights, the Arms are first call backwards, and then forwards, with so much the greater force: for the hands go backward before they take their tale. Quere, if the contrary motion of the Spirits, immediately before the Motion we intend, doth not cause the Spirits as it were to break forth with more force; as Britath also drawn, and kept in, cometh forth more forcibly: And in casting of any thing, the Arms, to make a greater swing, are first call backward.

Of Musick Tone and unequal Sounds, we have spoken before, but touch the pleasure and displeasure of the Senfes not so fully. Harsh Sounds, as et a Saw when it is sharpend, Grinding of one Stone against another, squeaking or scratching noises, make a loo vertically or horror in the Body, and set the Teeth on edge. The cause is, for that the objects of the Ear do affect the Spirits (immediately) most with pleasure and offence. We see there is no colour that affecteth the Eye much with displeasure. There be fights that are horrible, because they excite the memory of things that are odious or fearful; but the same things painted, do little affect. As for Smells, Tastes, and Touches, they be things that do affect by a Participation or Impulsion of the body of the Object. So it is Sound alone that doth immediately and incorpo-really affect most. This is most manifest in Musick, and Concord, and Discords in Musick: For all Sounds, whether they be sharp or flat, if they be sweet, have a soundness and equality; and if they be harsh, are unequal: For a Discord it self, is but a harshness of divers sounds meeting. It is true, that inequality, not flaid upon, but passing, is rather an increas of sweetness; as in the Purling of a Wretched String, and in the raucity of a Trumpet, and in the Nightingale-Pipe of a Regal, and in a Discord straight falling upon a Concord: But if you stay upon it, it is offensive. And therefore there be the three degrees of pleasing and displeasing in Sounds; Sweet sounds, Discord, and Harsh sounds, which we call by divers names, as Scrieching, or Grating, such as we now speak of. As for the setting of the Teeth on edge, we plainly see what an intercourse there is between the Teeth, and the Organ of the Hearing, by the taking of the end of a Bow between the Teeth, and striking upon the String.
NATURAL HISTORY

Century VII.

Here be Minerals and Fossils in great variety, but of Veins of Earth Medicinal but few. The chief are, Terra Lemnia, Terra Sigillata communis, and Bole Arminius; whereof Terra Lemnia is the chief. The Vertues of them are for Curing of Wounds, Stanching of Blood, Stopping of Fluxes and Rheums, and Arresting the Spreading of Poison, Infection, and Putrefaction: And they have of all other Simpers the perfectest and purest quality of Drying, with little or no mixture of any other quality. Yet it is true; that the Bole Arminick is the most cold of them, and that Terra Lemnia is the most hot; for which cause the Island Lemnos where it is digged, was in the old Fabulous Ages consecrated to Vulcan.

About the Bottom of the Sereights are gathered great quantities of Stones, which are gathered from the sides of Rocks, being as it were a large, but tough Moss. It is the more to be noted, because that there be but few Substances, Plant-like, that grow deep within the Sea: for they are gathered sometime Fifteen fathom deep. And when they are hid on Shore, they seem to be of great Bulk; but crumbled together, will be transported in a very small room.

I flemeth that Fish that are used to the Salt-water, do nevertheless delight more in fresh. We see that Salmon and Smelts love to get into Rivers, though it be against the Stream. At the Haven of Constantinople you shall have great quantities of Fish that come from the Euxine Sea, that when they come into the Fresh-water, do inebriate and turn up their Bellies, so as you may take them with your hand. I doubt there hath not been sufficient Ex-
periment made of putting Sea fish into Fresh-water, Ponds, and Pools. It is a thing of great use and pleasure; for so you may have them new at some good distance from the Sea: And besides, it may be the Fish will eat the pleasanter, and may fall to breed. And it is said, that Cocklefish Oysters, which are put into Pits, where the Sea goeth and cometh, (but yet so that there is a Fresh-water coming also to them when the Scavoids) become by that means better, and more grown.

The Turkish Bow giveth a very forcible Shoot, in much as it hath been known, that the Arrow hath pierced a Steel Target, or a piece of Brass of two Inches thick: But that which is more strange, the Arrow, if it be headed with Wood, hath been known to pierce through a piece of Wood of eight Inches thick. And it is certain, that we had in use at one time, for Sea-fight, short Arrows, which they called Sprights, without any other Heads, have Wood sharpened; which were discharged out of Muskets, and would pierce through the sides of Ships, where a Bullet would not pierce. But this dependeth upon one of the greatest secrets in all Nature; which is, that Similitude of Substance will cause Attraction, where the Body is wholly freed from the Motion of Gravity: For if that were taken away, Lead would draw Lead, and Gold would draw Gold, and Iron would draw Iron without the help of the Lead, Stone. But this same Motion of Weight or Gravity (which is a meer Motion of Matter, and hath no affinity with the Form or Kinde) doth kill the other Motion, except it fell be killed by a violent Motion; and in these incenses of Arrows, for then the Motion of Attraction by Similitude of Substance beginneth to shew it fell. But we shall handle this point of Nature fully in due place.

They have in Turkey, and the East, certain Confections, which they call Servets, which are like to Caudid Conferences, and are made of Sugar and Lemmons, or Sugar and Citrons, or Sugar and Violets, and some other Flowers; and some mixture of Amber for the more delicate persons: And those they dissolve in Water, and thereof make their Drink, because they are forbidden Wine by their Law. But I do much marvel, that no Englishman, or Dutchman, or German, doth set up Brewing in Constantinople; considering they have such quantity of Barley. For as for the general sort of Men, frugality may be the cause of Drinking Water; for that it is no small saving to pay nothing for ones drink: But the better sort might well bet on the coast. And yet I wonder the less at it, because I see France, Italy, or Spain, have not taken into use Beer or Ale; which (perhaps) if they did, would better both their Healths and their Complexions. It is likely it would be matter of great gain to any that should begin it in Turkey.

In Bathing in hot water, sweat (nevertheless) cometh not in the parts under the Water. The cause is, first, for that sweat is a kind of Colligation. And that kind of Colliquation is not made either by an over-dry Heat, or an over-moist Heat. For over-moisture doth somewhat extinguish the Heat; as we see, that even hot water quencheth Fire, and over-dry Heat shotteth the Pores. And therefore Men will sooner sweat covered before the Sun or Fire, then if they stood naked: And Earthen Bottles filled with hot water, do provoke in Bed a Sweat more daintily then Brick-bats hot. Secondly, Hot water doth cause Evaporation from the Skin; so as it spendeth the matter in those parts under the Water, before it influeth in Sweat,
Sweat. Again, Sweat cometh more plentifully, if the Heat be increased by degrees, then if it be greatest at first, or equal. The cause is, for that the Pores are better opened by a gentle Heat, then by a more violent; and by their opening the Sweat, infulteth more abundantly. And therefore Physicists may do well, when they provoke Sweat in Bed by Bottles, with a Decoction of Sudorific Herbs in Hot Water, to make two degrees of Heat in the Bottles, and to lay in the Bed the less-heated first, and after half an hour the more-heated.

Sweat is felt in taste. The cause is, for that part of the Nourishment which is freth and sweet, turneth into Blood and Flesh; and the Sweat is one of that part which is separate and cernelled. Blood allo raw, hath some flatness more then Flesh; because the Assimilation into Flesh is not without a little and subtle excretion from the Blood.

Sweat cometh forth more out of the upper parts of the Body then the lower. The reason is, because those parts are more replenished with Spirits, and the Spirits are they that put forth Sweat; besides, they are less fleshly, and Sweat infulteth (chiefly) out of the parts that are less fleshly and more dry, as the Forehead and Breast.

Men sweat more in sleep than waking, and yet sleep doth rather stay other Fluxions, then cause them; as Rheum, Losness of the Body, &c. The cause is, for that in Sleep the Heat and Spirits do naturally move inwards, and there reft. But when they are collected once within, the Heat becomes more violent and irritable, and thereby expelleth Sweat.

Cold Sweats are (many times) Mortal and near Death, and always ill and suspected; as in great Fears, Hypochondriacal Passions, &c. The cause is, for that Cold Sweats come by a relaxation or forsaking of the Spirits, whereby the Moisiture of the Body, which Heat did keep firm in the parts, seveth and infulteth out.

In those Diseases which cannot be discharged by Sweat, Sweat is ill, and rather to be stayed; as in Diseases of the Lungs, and Fluxes of the Belly; but in those Diseases which are expelled by Sweat, it caeleth and lightneth; as in Agues, Pestilences, &c. The cause is, for that Sweat in the latter fort is partly Critical, and tendeth forth the Matter that offendeth: But in the former, it either proceedeth from the Labor of the Spirits, which feteth them oppressed; or from Motion of Confin, when Nature not able to expel the Disease where it is leasted, moveth to an Expulsion indifferent over all the Body.

The Nature of the Glóworm is hitherto not well observed. Thus much we see, that they breed chiefly in the hottest Monaths of Summer; and that they breed not in Champaign, but in Bushes and Hedges. Whereby it may be conceived, that the Spirit of them is very fine, and not to be refined but by Summer heat. And again, that by reason of the fineness, it doth easily exhale. In Italy, and the Hotter Countreys, there is a Flie they call Luciolo, that shineth as the Glóworm doth, and it may be the Flying-Glóworm; but that Flie is chiefly upon Fens and Marshes. But yet the two former observations hold, for they are not seen but in the heat of Summer; and Sedges, or other Green of the Fens give as good shade as Buffles. It may be the Glóworms of the Cold Countreys ripen not so far as to be winged.

The Passions of the Mind work upon the Body the impressions following. Fear, caeleth Paleness, Trembling, the Standing of the Hair up right.
right, Startings, and Screaching. The Palpitations is caused, for that the Blood runneth inward to succor the Heart. The Trembling is caused, for that through the flight of the Spirits inward, the outward parts are dilated; and not sustained. Standing upright of the Hair is caused, for that by fluttering of the Pores of the Skin, the Hair that lyeth aloft must needs rise. Startings is both an apprehension of the thing feared, (and in that kind is a motion of shrinking) and likewise an Inquisition in the beginning what the matter should be, (and in that kind it is a motion of Erection;) and therefore when a Man would listen suddenly to any thing, he starteth; for the startings is an Erection of the Spirits to attend. Screaching is an appetite of expelling that which suddenly striketh the Spirits. For it must be noted, that many Motions, though they be unprofitable to expel that which hurteth, yet they are Offers of Nature, and cause Motions by Consent; as in Groaning, or Crying upon Pain.

Grief and Pain, cause Sighing, Sobbing, Groaning, Screaming, and Roaring, Tears, Distorting of the Face, Grinning of the Teeth, Sweating. Sighing is caused by the drawing in of a greater quantity of Breath to refresh the Heart that laboreth; like a great draught when one is thirsty. Sobbing is the same thing stronger. Groaning, and Screaming, and Roaring, are caused by an appetite of Expulsion, as hath been said; for when the Spirits cannot expel the thing that hurteth in their stræ to do it, by Motion of Consent they expel the Voice. And this is when the Spirits yield, and give over to refist; for if one do constantly resist Pain, he will not groan. Tears are caused by a Contraction of the Spirits of the Brain; which Contraction by consequence astringeth the Moisture of the Brain, and thereby sendeth Tears into the Eyes. And this Contraction or Compulsion causeth also Wringing of the Hands; for Wringing is a Gesture of Expression of Moisture. The Distorting of the Face is caused by a Contention, first, to bear and refist, and then to expel; which maketh the Parts knit together, and afterwards open. Grinding of the Teeth is caused (likewise) by a Gathering and Serring of the Spirits together to refist; which maketh the Teeth also to set hard one against another. Sweating is also a Compound Motion by the Labor of the Spirits, first to refist, and then to expel.

Joy causeth a Cheerfulness and Vigor in the Eyes, Singing, Leaping, Dancing, and sometimes Tears. All these are the effects of the Dilatation and coming forth of the Spirits into the outward parts, which maketh them more lively and stirres. We know it hath been seen, that Excessive sudden Joy hath caused present Death, while the Spirits did spred so much as they could not retire again. As for Tears, they are the effects of Compulsion of the Moisture of the Brain, upon Dilatation of the Spirits. For Compulsion of the Spirits worketh an Expression of the Moisture of the Brain by content, as hath been said in Grief: But then in Joy it worketh it diversely, viz. By Propulsion of the Moisture, when the Spirits dilate, and occupy more room.

Anger causeth Palpitations in some, and the going and coming of the colour in others; also Trembling in some, Swelling, Foaming at the Mouth, Stamping, Bending of the Eift. Palpitations, and Going, and Coming of the Colour, are caused by the Burning of the Spirits about the Heart; which to refresh themselves, call in more Spirits from the outward parts. And if the Palpitations be alone, without lending forth the colour again, it is commonly joyned with some fear: But in many there is no Palpitations at all, but contrariwise Redness about the Cheeks and Gils; which is by the sending forth of the Spirits,
Spirits, in an appetite to Revenge. Trembling in Anger is likewise by a calling in of the Spirits, and is commonly when Anger is joined with Fear. Swelling is caused both by a Dilatation of the Spirits by over-hearing, and by a Liquesfaction or Boiling of the Humors thereupon. Foaming at the Mouth is from the same cause, being an Ebulition. Stamping and Bending of the Feet are caused by an Imagination of the Act of Revenge.

Light Displeasure or Dislike causeth shaking of the Head, Frowning, and Knitting of the Brows. These effects arise from the same cause that Trembling and Horror do, namely, from the Reiting of the Spirits, but in a lesser degree. For the Shaking of the Head, is but a slow and definite Trembling; and is a Gesture of flight refus'd: And we see also, that a dislike causeth often that Gesture of the Hand, which we use when we refuse a thing, or warn it away. The Frowning and Knitting of the Brows, is a Gathering or Serrit of the Spirits, to refist in some measure. And we see also, this Knitting of the Brows will follow upon earnest Studying, or Cogitation of any thing, though it be without dislike.

Shame causeth Blushing, and calling down of the Eyes. Blushing is the Revert of Blood to the Face, which in the Passion of Shame, is the part that laboreth most. And although the Blushing will be seen in the whole Breast, if it be naked, yet that is but in passage to the Face. As for the calling down of the Eyes, it proceedeth of the Reverence a Man beareth to other Men, whereby, when he is ashamed, he cannot endure to look firmly upon others: And we see, that Blushing and the Calling down of the Eyes both, are more when we come before many; 

Pity causeth sometimes Tears, and a Flexion or Cast of the Eyes aside. Tears come from the cause, that they do in Grief: For Pity is but Grief in another's behalf. The Cast of the Eye, is a Gesture of Aversion or Loathsom to behold the object of Pity.

Wonder causeth Atonishment, or an Immovable Posture of the Body, Calling up of the Eyes to Heaven, and Lifting up of the Hands. For Atonishment, it is causeth by the Fixing of the Minde upon one object of Cogitation, whereby it doth not sparte and transfuse as it willeth: For in Wonder the Spirits flee not, as in Fear; but only settle, and are made lesapt to move. As for the Calling up of the Eyes, and Lifting up of the Hands, it is a kinde of Appeal to the Deity, which is the Author, by Power and Providence of strange Wonders.

Laughing causeth a Dilatation of the Mouth and Lips; a continued Expulsion of the Breath, with the loud Noise, which maketh the Interjection of Laughing; Shaking of the Breast and Sides; Running of the Eyes with Water, if it be violent and continued. Wherein first it is tobe understood, that Laughing is fierce (properly) a Passion, but hath his Source from the Intellct; for in Laughing, there ever precedeth a conceit of somewhat ridiculous. And therefore it is proper to Man. Secondly, that the cause of Laughing, is but a light touch of the Spirits, and not so deep an Impression as in other Passions. And therefore (that which hath no Affinity with the Passions of the Minde) it is moved, and that in great vehemency, only by Tickling some parts of the Body. And we see, that Men even in a griev'd state of Minde, yet cannot sometimes forbear Laughing. Thirdly, it is ever joyed with some degree of Delight: And therefore Exhilaration hath some Affinity with Joy, though it be much Lighter Motion.
Fifthly. That the object of it is Deformity, Absurdity, Shrewd turns, and the like. 

Now to speak of the causes of the effects before-mentioned, whereunto these general Notes give some light. For the Dilatation of the Mouth and Lips, continued Expulsion of the Breath and Voice, and Shaking of the Brows and Sides, they proceed (all) from the Dilatation of the Spirits, especially being sudden. So likewise the Running of the Eyes with Water, (as hath been formerly touched, where we spake of the Tears of Joy and Grief) is an effect of Dilatation of the Spirits. And for suddenness, it is a great part of the Matter: For we see that any Shrewd turn that lighteth upon another, or any Deformity, &c. moveth Laughter in the instant, which after a little time it doth nor. So we cannot laugh at any thing after it is stale, but whilest it is new. And even in Ticking, if you tickle the fides, and give warning, or give a hard or continued touch, it doth not move Laughter so much.

Luft caueth a Fragrancy in the Eys, and Priapism. The cause of both these is, for that in Lust the Sight and the Touch, are the things desired; and therefore the Spirits reftort to those parts which are most affected. And note well in general, (for that great use may be made of the observation) that (evermore) the Spirits in all Passions reftort most to the parts that labor most, or are most affected. As in the last, which hath been mentioned, they reftort to the Eyes and Venerous parts; in Fear and Anger to the Heart; in Shame to the Face; and in Light disliketh to the Head.

IThath been observed by the Ancients, and is yet believed, That the Sperm of Drunken-men is unfruitful. The cause is, for that it is over-moistned, and wanteth SPiritude. And we have a metry saying, That they that go drunk to Bed, get Daughters.

Drunken-men are taken with a plain Defect or Deflitution in Voluntary Motion; they reel, they tremble, they cannot stand, nor speak strongly. The cause is, for that the Spirits of the Wine oppres the Spirits Animal, and occupy part of the place where they are, and so make them weak to move; and therefore Drunken-men are apt to fall asleep. And Opiums and Supercriticals (as Poppy, Henbane, Hemlock, &c.) induce a kind of Drunkenness by the grossness of their Pavor, as Wine doth by the quantity of the Vapour. Besides, they rob the Spirits Animal of their Matter whereby they are nourished; for the Spirits of the Wine, prey upon it as well as they, and so they make the Spirits less supple and apt to move.

Drunken-men imagine every thing turneth round; they imagine also, that things come upon them; they see not well things afar off; those things that they see near hand, they see out of their place; and (sometimes) they see things double. The cause of the imagination that things turn round is, for that the Spirits themselves turn, being compressed by the Vapour of the Wine; for any Liquid Body upon Compressioun turneth, as we see in Water:) And it is all one to the sight, whether the Visual Spirits move, or the Object moveth, or the Medium moveth; and we see, that long turning round breedeth the same imagination. The cause of the imagination that things come upon them is for that the Spirits Visual themselves draw back, which maketh the Object seem to come on; and besides, when they see things turn round and move, Fear maketh them think they come upon them. The cause that they cannot see things afar off, is the weakness of the Spirits; for in every Megrim or Vertigo, there is an Obstruction joyned with a resemblance of Turning round, which we see also in the lighter sort of Swoonings.
The cause of seeing things out of their place, is the refraction of the Spirits visual; for the vapor is as an unequal Medium, and it is as the light of things out of place in Water. The cause of seeing things double, is the swift and unquiet motion of the Spirits (being opprest) to and fro; for (as was said before) the motion of the Spirits visual, and the motion of the object make the same appearances; and for the swift motion of the object, we see that if you fillip a Liver string, it floweth double or treble.

Men are sooner Drunk with small draughts then with great. And again, Wine fugured, inebriate les then Wine pure. The cause of the former is, that the Wine defcendeth not to fast to the Bottom of the Stomack, but maketh longer stay in the upper part of the Stomack; and sendeth Vapors fatter to the Head, and therefore inebriate sooner. And for the fame reafon, Sops in Wine (quantity for quantity) inebriate more then Wine of it felf. The cause of the latter is, that the Sugar doth infeft the Spirits of the Wine, and maketh them not fo eafe to resolve into Vapor. Nay further, it is thought to be some remedy againft inebriating, if Wine fugured be taken after Wine pure. And the fame effect is wrought neither by Oyl or Milk taken upon much Drinking.

The use of Wine in dry and confused Bodies is hurtful; in moist and full Bodies it is good. The cause is, for that the Spirits of the Wine do prey upon the Dew or radical moisture (as they term it) of the Body, and to deceive the Animal Spirits. But where there is moisture enough; or superfluous, their Wine helpeth to digest and deficate the moisture.

The Caterpillar is one of the moft general of Worms, and breedeth of Dew and Leaves; for we fee infinite number of Caterpillars which breed upon Trees and Hedges, by which the Leaves of the Trees or Hedges are in great part consumed; as well by their breeding out of the Leaf, as by their feeding upon the Leaf. They breed in the Spring chiefly, because then there is both Dew and Leaf. And they breed commonly when the East Winds have much blown: The cause whereof is, the dryness of that Wind; for to all Vivification upon Putrefaction, it is requisite the matter be not too moist: and therefore we see they have Cobwebs about them, which is a sign of a flamy dryness; as we see upon the Ground, whereupon by Dew and Sun Cobwebs breed all over. We fee also the Green Caterpillar breedeth in the inward parts of Roses, especially not blown where the Dew sticketh: But especially Caterpillars, both the greatest and the moft, breed upon Cabbages, which have a fat Leaf, and apt to putrefie. The Caterpillar toward the end of Summer waxeth volatile, and turneth to a Butterflie, or perhaps some other Flie. There is a Caterpillar that hath a Fur or Down upon him, and seemeth to have affinity with the Silk-worm.

The Flies Cantharides, are bred of a Worm or Caterpillar, but peculiar to certain Fruit-trees; as are the Fig-tree, the Pine-tree, and the Wilde Bryar; all which bear sweet Fruit, and Fruit that hath a kind of secret biting or Sharpnes. For the Fig hath a Milk in it that is sweet and corrosive; the Pine-Apple hath a Kernel that is strong and abiterfie; the Fruit of the Bryar is said to make Children, or those that eat them, scabbed. And therefore no marvel though Cantharides have such a Corrosive and Cauterizing quality; for there is not one other of the Infida, but is bred of a duller matter. The Body of the Cantharides is bright coloured, and it may be,
be, that the delicate coloured Dragon Flies may have likewise some Con
trolive quality.

Latent is remedied by Bathing or Anointing with Oyl and warm Wat
ter. The cause is, for that all Latent is a kind of Contusion and Com
pression of the Parts; and Bathing and Anointing give a Relaxation or Emol
ition: And the mixture of Oyl and Water is better then either of them a
tone, because Water enthrill better into the Pores, and Oyl after entry soft
neth better. It is found also, that the taking of Tobacco doth help and discharge
Latent. The reason whereof is partly, because by clearing or comforting
of the Spirits, it openeth the Parts compressed or contused: And chiefly,
because it refreitheth the Spirits by the Opiate Vertue thereof, and so dis
chargeth Weariness, as Sleep Likewise doth.

In going up a Hill the Knees will be most weary; in going down a Hill,
Thighs. The cause is, for that in the Lift of the Feet, when a man goeth up
the Hill, the weight of the Body beareth most upon the Knees; and in going
down the Hill, upon the Thighs.

The casting of the Skin, is by the Ancients compared to the breaking of
the Second or Call, but not rightly; for that were to make every cast-
ing of the Skin a new Birth: And besides, the Second is but a general
Cover, not shaped according to the Parts; but the Skin is shaped according
to the Parts. The Creatures that cast their Skin are, the Snake, the Viper,
the Grashopper, the Lizard, the Silk-worm, &c. Those that cast their Shell are,
the Lobster, the Crab, the Gras-fish, the Haddock or Dedman, the Corals, &c.
The old Skins are found, but the old Shells never: So as it is like they fall
off, and crumble away by degrees. And they are known by the extreme	
tenderness and Softness of the New Shell; and somewhat by the Freshness of
the Colour of it. The cause of the casting and Skin and Shell should seem
to be the great quantity of matter in those Creatures, that is fit to make
Skin or Shell: And again, the loofness of the Skin or Shell, that sticketh
not close to the Flesh. For it is certain, that it is the New Skin or Shell
that putteth off the old. So we see that in Deer, it is the young Horn that
putteth off the old. And in Birds, the young Feathers put off the old; and
Jo Birds that have much matter for their Beak, cast their Beaks, the new
Beak puttin off the old.

Lung not Fret but Hollow, which is in the Making of the Bed, or with
the Legs gathered up, which is in the Parture of the Body, is the more
wholesome. The reason is, the better comforting of the Stomach, which is
by that left pensile, and we see, that in weak Stomachs, the Slapping up of
the Legs high, and the Knees almost to the Mouth, helpeth and comforteth.
We see also, that Gally-flasted, notwithstanding their misery otherwise, are
commonly fat and pensile, and the reason is, because the Stomach is sup
ported somwhat in it, and is pensile in standing or going. And therefore
for Prolongation of Life, it is good to chafe those Exercises where the
Limbs move more then the Stomach and Belly; as in Rowing and in Saw
ing, being wet.

Frig盯s and Coldness are rather when we Aisle, after long sitting, then
while we sit. The cause is, for that the Vapors which were gathered by
sitting, by the sudden Motion lie more up into the Head.

Leasing upon any Part maketh it Num, and, as we call it, Asleep.

The
The cause is, that the Compresion of the Parts suffereth not the Spirits to have free access; and therefore, when we come out of it, we feel allinging or prickning, which is the re-entrance of the Spirits.

It hath been noted, That those Years are pestilential and unwholsome, when there are great numbers of Frogs, Flies, Locusts, &c. The cause is plain; for that those Creatures being ingendred of Putrefaction, when they abound, shew a general disposition of the Year, and constitition of the Air to Diseases of Putrefaction. And the same Prognostick (as hath been said before) holdeth, if you finde Worms in Oak-Apples. For the Constitution of the Air appeareth more futtility in any of these things, then to the sense of Man.

It is an observation amongst Country people, that Years of Store of Haws and Heps, do commonly portend cold Winters; and they ascribe it to God's Providence, that (as the Scripture faith) reacheth even to the falling of a Sparrow; and much more is like to reach to the Preservation of Birds in such Seasons. The Natural cause also may be the want of Heat, and abundance of Moisture in the Summer precedent, which putteth forth those Fruits, and mult needs leave great quantity of cold Vapors not dissipate, which caufeth the cold of the Winter following.

They have in Turkey a Drink called Coffee, made of a Berry of the same name, as black as Soot, and of a strong scent, but not aromatical, which they take, beaten into powder, in Water as hot as they can drink it: And they take it, and fit at it in their Coffee-Houses, which are like our Taverns. This Drink comforrth the Brain and Heart, and helpeth Digestion. Certainly this Berry Coffee, the Root and Leaf Betti, the Leaf Tobacco, and the Teare of Poppy, (Opium) of which, the Turks are great takers (supposing it expelth all fear; do all condence the Spirits, and make them strong and alegar. But it seemeth they are taken after several manners; for Coffee and Opium are taken down, Tobacco but in Smoak, and Betti is but champed in the Mouth with a little Lime. "Tis like, there are more of them, if they were well found out, and well corrected. Quere, of Henbano-seed, of Mandrake, of Saffron, Root and Flower, of Folium Indium, of Ambergrise, of the Africain Amonyum, if it may be had; and of the Scarlet Powder which they call Kermes; and (generally) of all such things as do inebriate and provoke sleep. Note, that Tobacco is not taken in Root or Seed, which are more forcible ever then Leaves.

The Turks have a black Powder made of a Mineral called Alcholot, which with a fine long Pencil they lay under their Eye-lids, which doth colour them black, whereby the White of the Eye is set off more white. With the same Powder they colour also the Hairs of their Eye-lids, and of their Eye-brows, which they draw into embowed Arches. You shall finde that Xenophon maketh mention, that the Arabs used to paint their Eyes. The Turks use with the same Tincture to colour the Hair of their Heads and Beards black: And divers with us that are grown Gray, and yet would appear young, finde means to make their Hair black, by combing it (as they lay) with a Leaden Comb, or the like. As for the Chinese, that are of an ill Complexion, (being Olifather) they paint their Cheeks Scarlet, especially their King and Grandee. Generally, Barbarous people that go naked, do not onely paint them.
themselves, but they pounce and take their skin, that the Painting may not be taken forth, and make it into Works: So do the West-Indians; and so did the ancient Picts and Brions. So that it seemeth Men would have the colours of Birds’ Feathers, if they could tell how, or at least they will have gay Skins in stead of gay Cloaths.

It is strange that the use of Bathing as a part of Diet is left. With the Romans and the Greeks it was as usual as Eating or Sleeping; and to it amongst the Turks at this day; whereas, with us, remitteth but as a part of Physick. I am of opinion, that the use of it as it was with the Romans, was hurtful to health; for that it made the Body soft and easy to waste. For the Turks it is more proper, because their drinking Water, and feeding upon Rice, and other Food of small nourishment, maketh their Bodies so solid and hard, as you need not fear that Bathing should make them frothy. Besides, the Turks are great fitters, and seldom walk; whereby they sweat less, and need Bathing more. But yet certain it is, that Bathing, and especially Anointing, may be so used, as it may be a great help to Health, and Prolongation of Life. But hereof we shall speak in due place, when we come to handle Experiments Medicinal.

The Turks have a pretty Art of Chamoletting of Paper, which is not with us in use. They take divers Oyled Colours, and put them severally (in drops) upon Water, and stir the Water lightly, and then wet their Paper (being of some thickness) with it; and the Paper will be waved and veined like Chamoile or Marble.

It is somewhat strange, that the Blood of all Birds, and Beasts, and Fishes, should be of a black colour, and only the Blood of the Cuttle should be as black as Ink. A man would think that the cause should be the high Concentration of that Blood; for we see in ordinary Puddings, that the Boiling turneth the Blood to be black; and the Cuttle is accounted a delicate Meat, and is much in request.

It is reported of credit, That if you take Earth from Land adjoyning to the River of Nile, and preferre it in that manner, that it neither come to be wet nor wafted, and weigh it daily, it will not alter weight until the Seventeenth of June, which is the day when the River beginneth to rise, and then it will grow more and more ponderous till the River cometh to his height. Which if it be true, it cannot be caufed but by the Air, which then beginneth to condence; and so turneth within that small Mould into a degree of Moiture, which produceth weight. So hath been observed, that Tobacco cut and weighed, and then dried by the Fire, lost weight; and after being laid in the open Air, recovereth weight again. And it should seem, that as soon as ever the River beginneth to increafe, the whole Body of the Air thereabouts suffereth a change: For (that which is more strange) it is credibly affirmed, that upon that very day, when the River first riseth, great Plagues in Cairo ule suddenly to break up.

These that are very cold, and especially in their Feet, cannot get to Sleep. The cause may be, for that in Sleep is required a free respiration, which cold doth shut in and hinder: For we see, that in great Cold, one can scarce draw
draw his Breath. Another cause may be, for that Cold calleteth the Spiritsto succor; and therefore they cannot so well close, and go together in the Head, which is ever requisite to Sleep. And for the same cause, Pain and noise hinder sleep, and darkness (contrariwise) furthereth sleep.

Some noises (whereof we make in the t2 Experiments) help Sleep: as the blowing of the Wind, the trickling of Water, humming of Bees, soft singing, reading, &c. The cause is, for that they move in the Spirits a gentle attention; and whatsoever moveth attention, without too much labor, stillleth the natural and discursive motions of the Spirits.

Sleep nouriseth, or at least preserveth, Bodies a long time, without other nourishment. Beasts that sleep in Winter, (as it is noted of wilde Bears) during their sleep wax very fat, though they eat nothing. Bats have been found in Ovens, and other hollow close places, matted one upon another; and therefore it is likely that they sleep in the Winter, and eat nothing. Quære whether Bees do not sleep all Winter, and spare their Honey. Butter-flies, and other Flies, do not only sleep, but lie as dead all Winter; and yet with a little heat of Sun or Fire revive again. A Dormouse, both Winter and Summer will sleep some days together, and eat nothing.

To restore Teeth in Age, were Magna Nature, it may be thought of; but howsoever, the nature of the Teeth deverveth to be enquired of, as well as the other parts of Living Creatures Bodies.

There be five parts in the Bodies of Living Creatures that are of hard substances; the Skull, the Teeth, the Bones, the Horns, and the Nails. The greatest quantity of hard substance continued, is towards the Head; for there is the Skull of one entire Bone, there are the Teeth, there are Maxillary Bones, there is the hard Bone that is the Instrument of Hearing, and thence issue the Horns. So that the building of Living Creatures Bodies is like the building of a Timmer-house, where the Walls and other parts have Columns and Beams; but the Roof is in the better fort of Houses, all Tile, or Lead, or Stone. As for Birds, they have three other hard substances proper to them; the Bill, which is of the like matter with the Teeth, for no Birds have Teeth; the Shell of the Egg, and their Quills; for as for their Spur, it is but a Nail. But no Living Creatures that have Shells very hard (as Oysters, Cockles, Mollusks, Shalops, Crabs, Lobsters, Craw-fish, Shrimps, and especially the Torsis) have Bones within them, but only little Grifles.

Bones, after full growth, continue at a stay, and so doth the Skull. Horns, in some Creatures, are cast and renewed: Teeth stand at a stay, except their wearing. As for Nails, they grow continually, and Bills and Beaks will overgrow, and sometimes be cast, as in Eagles and Parrots.

Most of the hard substances fle the to extremities of the Body; as Skull, Horns, Teeth, Nails, and Beaks; onely the Bones are more inward, and clad with Fleth. As for the Entrails; they are all without Bones, save that a Bone is sometimes found in the Heart of a Stag, and it may be in some other Creatures.

The Skull hath Brains, as a kind of Marrow within it. The Back-bone hath one kind of Marrow, which hath an affinity with the Brain; and other Bones of the Body have another. The Jaw-bones have no Marrow se- vered, but a little Pulp of Marrow diffused. Teeth likewise are thought to have a kind of Marrow diffused, which causeth the Sense and Pain: But it
Natural History

751. is rather Sinew, for Marrow hath no Sense, no more then Blood. Horn is alike throughout, and so is the Nail.

None other of the hard Substances have Sense, but the Teeth; and the Teeth have Sense, not onely of Pain, but of Cold.

But we will leave the Enquiries of other Hard Substances unto their several places, and now enquire only of the Teeth.

752. The Teeth are in Men of three kinds, Sharp, as the Fore-teeth; Broad, as the Back-teeth, which we call the Molar-teeth, or Grinders; and Pointed-teeth, or Canine, which are between both. But there have been some Men that have had their Teeth undivided, as of one whole Bone, with some little mark in the place of the Division, as Pythias had. Some Creatures have over-long or out-growing Teeth, which we call Fangs or Talcs; as Beasts, Pikes, Salmons, and Dogs, though less. Some Living Creatures have Teeth against Teeth, as Men and Horses; and some have Teeth, especially their Molar-teeth indented one within another like Saws, as Lions; and fo again have Dogs. Some Fishes have divers Rows of Teeth in the Roof of their Mouths, as Pikes, Salmons, Troutts, &c. and many more in Salt-water. Snakes and other Serpents have venomous Teeth, which are sometimes mistaken for their Sting.

No Beast that hath Horn hath upper-teeth; and no Beast that hath Teeth above, wanteth them below. But yet if they be of the same kinde, it followeth not, that if the hard matter goeth not into upper-teeth, it will go into Horns; nor yet conversely, for Does that have no Horns, have no upper-teeth.

Horses have, at three years old, a Tooth put forth which they call the Colis-teeth; and at four years old, there cometh the Mark-teeth, which hath a hole so big as you may lay a Peaft within it; and that weareth shorter and shorter every year, till that at eight years old the Tooth is smooth, and the hole gone; and then they say, That the Mark is out of the Horse's Mouth.

755. The Teeth of Men breed first; when the Child is about a year and half old, and then they cast them; and new come about seven years old. But divers have Backward-teeth come forth at twenty, yes, some at thirty, and forty. Queue of the manner of the coming of them forth. They tell a tale of the old Countes of Desmond, who lived till she was Seventie years old, that she did Dentire twice or thrice, calling her old Teeth, and others coming in their place.

Teeth are much hurt by Sweet-meats, and by Painting with Mercury, and by things over-hot, and by things over-cold, and by Rheums. And the pain of the Teeth, is one of the sharpest of pains.

Concerning Teeth, these things are to be considered. 1. The preserving of them. 2. The keeping of them white. 3. The drawing of them with leaff pain. 4. The staying and calming of the Tooth-ach. 5. The binding in of Artificial Teeth, where Teeth have been strucken out. 6. And last of all, that great one, of restoring Teeth in Age. The infinaces that give any likelihood of restoring Teeth in Age, are, The late coming of Teeth in some, and the renewing of the Beaks in Birds, which are commaterial with Teeth. Queue therefore more particularly how that cometh. And again, the renewing of Horns. But yet that hath not been known to have been provoked by Arts; therefore let tryal be made, whether Horns may be procured to grow in Beasts that are not horned, and how; and whether they may be procured to come larger then usual, as to make an Ox or a Deer have
have a greater Head of Horns; and whether the Head of a Deer, that by age is more spitted, may be brought again to be more branched. For these trials and the like will shew, Whether by art such hard matter can be called and provoked. It may be tried also, whether Birds may not have something done to them when they are young, whereby they may be made to have greater or longer Bills, or greater and longer Talons: And whether Children may not have some Wall, or something to make their Teeth better and stronger. Coral is in use as an help to the Teeth of Children.

Some Living Creatures generate but at certain seasons of the year; as Deer, Sheep, Wilde Cows, &c. and most sorts of Birds and Fishes: Others at any time of the year, as Men; and all Domestick Creatures, as Horses, Hogs, Dogs, Cats, &c. The cause of Generation at all seasons, seemeth to be Fruits; for Generation is from Redundance. This Fruits ariseth from two causes, either from the Nature of the Creature, if it be Hot, and Moiſt, and Sanguine, or from Plenty of Food. For the first, Men, Horses, Dogs, &c. which breed at all seasons, are full of Heat and Moisture; Doves are the fullest of Heat and Moisture amongst Birds, and therefore breed often, the Tame Dove almost continually. But Deer are a Melancholy dry Creature, as appeareth by their feverishness, and the hardness of their Flesh. Sheep are a cold Creature, as appeareth by their mildness, and for that they seldom drink. Most sorts of Birds are of a dry substance in comparison of Beasts; Fishes are cold. For the second cause, Fruits of Food, Men, Kine, Swine, Dogs, &c. feed full. And we see, that those Creatures which, being Wilde, generate seldom, being tame, generate often; which is from warmth and fulness of food. We finde that the time of going to Rut of Deer is in September, for that they need the whole Summers Feed and Grass to make them fit for Generation; and if Rain come early about the middle of September, they go to Rut somewhat the sooner; if Drought, somewhat the later. So Sheep, in respect of their small heat, generate about the same time, or somewhat before. But for the most part, Creatures that generate at certain seasons generate in the Spring; as Birds and Fishes: For that the end of the Winter, and the heat and comfort of the Spring prepareth them. There is also another reason why some Creatures generate at certain seasons, and that is the Relation of their time of Bearing to the time of Generation; for no Creature goeth to generate whilst the Female is full, nor whilst the beast is busy in treading, or rearing her young; and therefore it is found by experience, that if you take the Eggs or Young-ones out of the Nefts of Birds, they will fall to generate again three or four times one after another.

Of Living Creatures, some are longer time in the Womb, and some shorter. Women go commonly nine Moneths, the Cow and the Ewe about six Moneths, Does go about nine Moneths, Mares eleven Moneths, Bitches nine Weeks; Elephants are said to go two years, for the received Tradition of ten years is fabulous. For Birds there is double enquiry; the distance between the treading or coupling, and the laying of the Eggs; and again, between the Egg laid, and the diclosing or hatching. And amongst Birds there is less diversity of time than amongst other Creatures, yet some there is; for the Hen siteth but three weeks, the Turkey-hen, Goose and Duck, a moneth. Quatre of others. The cause of the great difference of times amongst Living Creatures is, either from the nature of the Kind,
Natural History;

or from the constitution of the Womb. For the former, those that are longer in coming to their maturity or growth, are longer in the Womb, as is chiefly seen in Men; and to Elephants, which are long in the Womb, are long time in coming to their full growth. But in most other kinds, the constitution of the Womb (that is, the hardness or dryness thereof) is concurrent with the former cause. For the Calf hath about four years of growth, and so the Fawn, and so the Calf; but Whelps, which come to their growth (commonly) within three quarters of a year, are but nine weeks in the Womb. As for Birds, as there is less diversity amongst them in the time of their bringing forth, so there is less diversity in the time of their growth, most of them coming to their growth within a twelve-month.

Some Creatures bring forth many young ones at a Birth; as Hares, Hares, Coney's, &c. some (ordinarily) but one; as Women, Lionesses, &c. This may be caused, either by the quantity of Sperm required to the producing one of that Kind: which if less be required, may admit greater numbers; if more, fewer; or by the Partitions and Cells of the Womb, which may defer the Sperm.

There is no doubt but Light by Refraction will shew greater, as well as things coloured; for like as a Shilling in the bottom of the Water will shew greater, so will a Candle in a Lanthorn in the bottom of the Water. I have heard of a practice, that Glowworms in Glasses were put in the Water to make the Fire come. But I am not yet informed, whether when a Diver diverseth, having his eyes open, and twimmeth upon his back, whether (I say) he feeth things in the Air, greater or lesser. For it is manifest, that when the eye standeth in the finer medium, and the object is in the grosser, things shew greater, but contrariwise, when the eye is placed in the grosser medium, and the object in the finer, how it worketh I know not.

It would be well boulder out, whether great Refractions may not be made upon Reflexions, as well as upon direct beams. For example, we see, that take an empty Bafoon, put an Angel of Gold, or what you will into it: then go so far from the Bafoon till you cannot see the Angel, because it is not in a right Line; then fill the Bafoon with Water, and you shall see it out of his place, because of the Reflexion. To proceed therefore, put a Looking-glass into a Bafoon of Water; I suppose you shall not see the Image in a right Line, or at equal Angles, but aside. I know not whether this Experiment may not be extended so, as you might see the Image, and not the Glass; which for beauty and strangeness were a fine proof, for then you shall see the Image like a Spirit in the Air. As for example, if there be a Citron or Pool of Water, you shall place over against it a picture of the Devil, or what you will, so as you do not see the Water, then put a Looking-glass in the Water: Now if you can see the Devils picture aside, not seeing the Water, it will look like a Devil indeed. They have an old tale in Oxford. That Fryer Bacon walked between two Steeple's, which was thought to be done by Glasses, when he walked upon the Ground.

A Weighty Body put into Motion, is more easily impelled then at first when it refleth. The cause is, partly because Motion doth dilate the Porpore of solid Bodies, which beside their Motion of Gravity, have in them a Natural Appetite not to move at all; and partly, because a Body that refleth doth get, by the resistance of the Body upon which it refleth, a stronger compession.
Tickling is most in the Soles of the Feet, and under the Arm-holes, and on the Sides. The cause is, the thinnesse of the Skin in those parts joyned with the rarenesse of being touched there; for all Tickling is a light motion of the Spirits, which the thinness of the Skin, and suddeness and rareness of touch do further. For we see a Feather or a Kifh drawn along the Lip or Check, doth tickle; whereas a thing more obtuse, or a touch more hard, doth not. And for suddeness, we see no man can tickle himself: We see also, that the Palm of the Hand, though it hath as thin a Skin as the other parts mentioned, yet is not ticklish, because it is accustomed to be touched. Tickling also causeth Laughter. The cause may be the emission of the Spirits, and so of the Breath, by a flight from Tickling; for upon Tickling, we see there is ever a swelling or shrinking away of the parts to avoid it; and we see also, that if you tickle the Nostrils with a Feather or Straw, it procureth Sneezing, which is a sudden emission of the Spirits, that do likewise expel the moisture. And Tickling is ever painful, and not well endured.

It is strange, that the River of Nile over flowing, as it doth the Country of Egypt, there should be nevertheless little or no Rain in that Country. The cause must be, either in the Nature of the Water, or in the Nature of the Air, or both. In the Water, it may be ascribed either unto the long race of the Water; for swift-running Waters vapor not so much as standing Waters, or else to the concoction of the Water; for Waters well concocted, vapor not so much as Waters raw, no more then Waters upon the fire do vapor so much, after some time of boiling, as at the first. And it is true, that the Water of Nile is sweeter then other Waters in taste; and it is excellent good for the Stone, and Hypochondriacal Melancholy, which sheweth it is lenifying; and it runneth through, a Country of a hot Climate, and flat, without shade either of Woods or Hills, whereby the Sun must needs have great power to concoct it. As for the Air (from whence I conceive this want of Showers cometh chiefly) the cause must be, for...
for that the Air is of it felt thin and thrifty, and as soon as ever it geteth any moisture from the Water, it imbibeth, and dissipateth it in the whole Body of the Air, and sufficeth it not to remain in Vapour, whereby it might breed Rain.

It hath been touched in the Title of Perlocations, (namely, such as are inwards) that the Whites of Eggs and Milk do clarify; and it is certain, that in Egypt they prepare and clarify the Water of Nile, by putting it into great Jars of Stone, and stirring it about with a few stamped Almonds, whereby they also set the Mouth of the Vessel; and so draw it off, after it hath retailed some time. It were good to try this Clarifying with Almonds in new Beer or Malt, to halen and perfect the Clarifying.

There be scarce to be found any Vegetables that have Branches and no Leaves, except you allow Coral for one. But there is also in the Deferts of S. Marco in Egypt, a Plant which is long. Leaves, brown of colour, and branched like Coral, fabe that it clofeoth at the top. This being set in Water within House, spreadeth and displayeth strangely; and the people thereabout have a superstitious belief, that in the Labor of Women it helpeth to the caffe Deliverance.

The Crystalline Venice-Glass is reported to be a mixture, in equal portions, of Stones brought from Pavia, by the River Ticinum, and the Ashes of a Weed called by the Arabes, Kal, which is gathered in a Defart between Alexandria and Rosetta; and is by the Egyptians used first for Fuel, and then they crush the Ashes into lumps like a Stone, and so sell them to the Venetians for their Glass-works.

It is strange, and well to be noted, how long Caresaffes have continued uncorrupt, and in their former Dimensions; as appeareth in the Mummies of Egypt, having lusted, as is conceived (some of them) three thousand years. It is true, they finde means to draw forth the Brains, and to take forth the Entrails, which are the parts aptest to corrupt. But that is nothing to the wonder; for we see what a soft and corruptible substance the Flesh of all the other parts of the Body is. But it should seem, that according to our observation and axiom, in our hundredth Experiments, Pureration, which we conceive to be so natural a Period of Bodies, is but an accident, and that Matter maketh not that haffe to Corruption that is conceived; and therefore Bodies in shining Amber, in Quick-silver, in Balms, (whereof we now speake) in Wax, in Honey, in Gums, and (it may be) in Conservatories of Snow, &c. are preferred very long. It need not go for repetition, if we resume again that which we said in the aforesaid Experiments concerning Annihilation, namely, That if you provide against three caules of Pureration, Bodies will not corrupt. The first is, that the Air be excluded; for that undermineth the Body, and conspireth with the Spirit of the Body to dissolveit. The second is, that the Body adjacent and ambient be not Commaterial, but meerly Heterogenous towards the Body that is to be preserved; for if nothing can be received by the one, nothing can issue from the others such are Quick-silver and White Amber to Herbs and Flies, and such Bodies. The third is, that the Body to be preserved, be not of that gross that it may corrupt within it self, although no part of it issue into the Body adjacent: and therefore it must be rather thin and
and final measure of bulk. There is a fourth Remedy also, which is, That if the Body to be preferred, be of bulk, as a Corpse is, then the Body that incloseth it must have a virtue to draw forth and dry the moiture of the inward Body; for else the Purgation will play within, though nothing issue forth. I remember Livy doth relate, that there were found at a time two Coffins of Lead in a Tomb, whereas the one contained the Body of King Numa, it being some four hundred years after his death: and the other, his Books of Sacred Rites and Ceremonies, and the Discipline of the Pontiffs: And that in the Coffin that had the Body, there was nothing (at all) to be seen but a little light Cinders about the sides; but in the Coffin that had the Books, they were found as fresh as if they had been but newly written, being written in Parchment, and covered over with Watch-candles of Wax three or four fold. By this it seemeth, that the Romans in Numa's time were not so good Embalmers as the Egyptians were; which was the caufe that the Body was utterly 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 keep his Dimension; but withal, that notwithstanding all the Embalming (which no doubt was of the best) the Body was so tender, as Caesar touching but the Nose of it, defaced it. Which maketh me 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 material; namely, that the ancient Egyptian Mummies were swaddled in a number of Folds of Linnen, befmeared with Gums, in manner of Scar-cloth; which it doth not appear, was practised upon the Body of Alexander.

Near the Castle of Cæsir, and by the Wells Affan, in the Land of Idauna, a great part of the way, you would think the Sea were near hand, though it be a good distance of: And it is nothing, but the shining of the Nitre upon the Sea-shore, tis such abundance of Nitre the Shores there do put forth.

The Dead-Sea, which vomitheth up Bitumen, is of that Captivity. As Living Bodies, bound hand and foot, and cast into it, have been borne up and not sunk: Which sheweth, that alflinking into Water, is but an over-weight of the Body put into the Water, in respect of the Water; so that you may make Water so strong and heavy of Quicksilver, (perhaps) or the like, as may bear up Iron; of which I see no use, but Impotence. We see also, that all Metals, except Gold, for the same reason swim upon Quicksilver.

It is reported, that at the Foot of a Hill near the Mere mortuum, there is a Black Stone (whereof Pilgrims make Fires) which burneth like a Coal, and dimmisheth not, but only waxeth brighter and whiter. That it should do so, is not strange; for we see Iron red hot burneth and consumeth not. But the strangeess is, that it should continue any time so; for Iron, as soon as it is out of the Fire, deadeth straight-ways. Certainly, it were a thing of great use and profit, if you could finde out Fuel that would burn hot, and yet last long. Neither am I altogether incredulous, but there may be such Candles as (they say) are made of Salamanders Wool, being a kinde of Mineral which whiteth also in the burning; and consumeth not. The Question is this, Flame must be made of something; 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 Vapor in a Body, (which Spirit or Vapor hath no weight) such as is the matter of Ignis Sama. But then you will say, that that Vapor also can last but a short time. To that it may be answered, That by the help of Oyl and Wax, and other Candle-stuff, the flame may continue, and the wick not burnt.

Sea-coal last longer then Char-coal; and Char-coal of Roots, being coaled into great pieces, last longer then ordinary Char-coal. Turf, and Peat, and Cow-hides are cheap Jewels, and last long. Small-coal or Char-coal pour’d upon Char-coal, make them last longer. Sedge is a cheap Jewell to Brew or Bake with, the better, because it is good for nothing else. Tryal would be made of some mixture of Sea-coal with Earth, or Chalk; for if that mixture be, as the Sea-coal-men use it pravity, to make the Bulk of the Coal greater, it is deceit; but if it be used purposely, and be made known, it is faving.

It is at this day in use in Gaza, to couch Pots-herds or Vessels of Earth in their Walls, to gather the Wind from the top, and to pass it down in Spouts into Rooms. It is a device for freshnes in great Heats. And it is said, there are some Rooms in Italy and Spain for freshnes, and gathering the Winds and Air in the Heats of Summer; but they be but Pennings of the Winds, and enlarging them again, and making them reverberate, and go round in Circles, rather then this device of Spouts in the Wall.

There would be used much diligence in the choice of some Bodies and Places (as it were) for the tainting of Air, to discover the wholesomeness or unwholesomeness as well of Sealons, as of the Seats of Dwellings. It is certain, that there be some Houses wherein Confitures and Pies, will gather Mould more then in others; and I am perswaded, that a piece of raw Flesh or Fish, will sooner corrupt in some Airs then in others. They benoble Experiments that can make this discovery; for they serve for a Natural Divination of Sealons, better then the Astronomers can by their Figures; and again, they teach men where to chuse their dwelling for their better health.

There is a kind of Stone about Bethlehem which they grind to powder, and put into Water, whereof Catrel drink, which makes them give more Milk. Surely, there would be some better Tryals made of Mixtures of Water in Ponds for Catrel, to make them more Milk, or to fatten them, or to keep them from Murrain. It may be, Chalk, and Nitre are of the belt.

Tis reported, that in the Valley near the Mountain Carmel in Judea, there is a Sand, which of all other, hath most affinity with Glafs, intomuch, as other Minerals laid in it, turn to a glassie substance without the fire; and again, Glafs put into it, turneth into the Mother-fand. The thing is very strange, if it be true; and it is likeliest to be caused by some natural Furnace of Heat in the Earth, and yet they do not speak of any Eruption of Flames. It were good to try in Glafs works, whether the crude Materials of Glafs mingled with Glafs, already made and remoulted, do not facilitate the making of Glafs with les heat.
In the Sea, upon the South-West of Sicily, much Coral is found. It is a Submarine Plant, it hath no leaves, it brancheth only when it is under Water; it is soft, and green of colour; but being brought into the Air, it becometh hard, and shining red, as we see. It is said also to have a white Berry, but we finde it not brought over with the Coral: Belike it is cast away as nothing worth. I desire better of it, for the discovery of the Nature of the Plant.

The Manna of Calabria is the best, and in most plenty. They gather it from the Leaf of the Mulberry-tree; but not of such Mulberry-trees as grow in the Valleys: And Manna feedeth upon the Leaves by night, as other Dews do. It should seem, that before those Dews come upon Trees in the Valleys, they dissipate and cannot hold out. It should seem also, the Mulberry-leaf itself hath some coagulating virtue, which infusilateth the Dew, for that it is not found upon other Trees: And we see by the Silk worm, which feedeth upon that Leaf, what a dainty smooth Juice it hath; and the Leaves also (especially of the Black Mulberry) are somewhat brisly, which may help to preserve the Dew. Certainly, it were not amiss to observe a little better the Dews that fall upon Trees or Herbs growing on Mountains; for it may be, many Dews fall that spend before they come to the Valleys. And I suppose, that he that would gather the best My Dew for Medicine, should gather it from the Hills.

It is said, they have a manner to prepare their Greek Wines, to keep them from Fuming and Inebriating, by adding some Sulphur or Album; whereof the one is Unctuous, and the other is Astringent. And certain it is, that those two Natures do represent the Fumes. This Experiment would be transferred unto other Wine and Strong-Beer, by putting in some like Substances while they work; which may make them both to Fume less, and to inflame less.

It is conceived by some; (not improbably) that the reason why Wild-fires (whereof the principal ingredient is Bitumen) do not quench with Water, is, 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 near Tusculum, which they call the Court of Vulcan, you shall hear under the Earth a horrible thundring of Fire and Water conflicting together; and there break forth also Spouts of boiling Water. Now that place yieldeth great quantities of Bitumen; whereas Etna, and Vesuvius, and the like, which consist upon Sulphur, shoot forth Smoak, and Ashes, and Pumice, but no Water. It is reported also, that Bitumen mingled with Lime, and put under Water, will make, as it were, an artificial Rock, the substance becometh so hard.

There is a Cement compounded of Flower, Whites of Eggs, and Stone powdered, that becometh hard as Marble, wherewith Pisces Marblatis, near Chalcis, is said to have the Walls plastered. And it is certain, and tried, that the Powder of Lead-stone and Flint, by the addition of Whites of Eggs and Gum-dragon, made into Paste, will in a few days harden to the hardnefs of a Stone.
I T hath been noted by the Ancients, that in full or impure Bodies, Ulcers or Hurts in the Legs are hard to cure, and in the Head more easie. The cause is, for that Ulcers or Hurts in the Legs require Desiccation, which by the defluxion of Humors to the lower parts is hindered, whereas Hurts and Ulcers in the Head require it not; but, contrariwise, Dryness maketh them more apt to Consolidate. And in Modern observation, the like difference hath been found between French men and Englishmen; whereof the one Constitution is more dry, and the others more moist: And therefore a Hurt of the Head is harder to cure in a Frenchman, and of the Leg in an Englishman.

I T hath been noted by the Ancients, that Southern Winds blowing much without Rain, do cause a Feverous Diffusion of the Air; but with Rain, not. The cause is, for that Southern Winds do of themselves qualifie the Air to be apt to cause Fevers; but when Showers are joyned, they do refregitate in part, and check the sultry Heat of the Southern Wind. Therefore this holdeth not in the Sea-coasts, because the vapor of the Sea without Showers doth refresh.

I T hath been noted by the Ancients, that Wounds which are made with Brass, heal more easily than Wounds made with Iron. The cause is, for that Brass hath in itself a Sanative Virtue, and so in the very instant helpeth somewhat; but Iron is Corrofive, and not Sanative. And therefore it were good that the Instruments which are used by Chirurgions about Wounds were rather of Brass then Iron.

In the cold Countreys, when Mens Noses and Ears are mortised, and (as it were) Gangrene with cold, if they come to a Fire, they rot off presently. The cause is, for that the few Spirits that remain in those parts are suddenly drawn forth, and so Putrefaction is made compleat. But Snow put upon them helpeth, for that it preserveth those Spirits that remain till they can revive; and besides, Snow hath in it a secret warmth; as the Monk proved out of the Text, Qui hanc Nivem scit Lanam, Celum scit Cremes flagriis; whereby he did infer, that Snow did warm like Wool, and Frost did fret like Ashes. Warm Water also doth good, because by little and little it openeth the pores, without any sudden working upon the Spirits. This Experiment may be transferred unto the cure of Gangrenes, either coming of themselves, or induced by too much applying of Opiates; wherein you must beware of dry Hear, and retort to things that are Refrigerant, with an inward warmth and virtue of cheering.

W Eigh Iron and Aqua-fortis severally, then disolve the Iron in the Aqua-fortis, and weigh the Dissolution; and you shall finde it to bear as good weight as the Bodies did severally, notwithstanding a good deal of wafle by a thick vapor that issueth during the working; which issueth, that the opening of a Body doth increase the weight. This was tried once or twice, but I know not whether there were any Error in the Tryal.

Take of Aqua-fortis two Ounces, of Quick-silver two Drachms, (for that charge the Aqua-fortis will bear) the Dissolution will not bear a Flint as big as a Nutmeg; yet (no doubt) the increasing of the weight of Water
Century VIII.

Water will increase his power of bearing; as we see Brown, when it is felt enough, will bear an Egg. And I remember well a Physician, that used to give some Mineral Baths for the Gout &c. And the Body when it was put into the Bath, could not get down so easily as in ordinary Water. But if you cut the weight of the Mercury, more then the weight of a Stone, doth not compensate the weight of a Stone, more then the weight of the Aqua-forte.

Let there be a Body of unequal weight, (as of Wood and Lead, or Bone and Lead;) if you throw it from you with the light end forward, it will turn, and the weightier end will recover to be forwards, unless the Body be over-long. The cause, is, for that the more Dense Body hath a more violent pressure of the parts from the first impulsion; which is the cause (though heretofore not found out, as hath been often said,) of all Violent Motions: And when the hinder part moveth swifter (for that is least endureth pressure of parts,) then the forward part can make way for it, and must needs be that the Body turn over; for (turned,) it can more easily draw forward the lighter part.

Galileus notice it well, That if an open Trough, wherein Water is, be driven fatter then the Water can follow, the Water gathereth upon an heap towards the hinder end, where the motion began; which he supposeth (holding confidently the motion of the Earth) to be the cause of the Ebbing and Flowing of the Ocean, because the Earth over-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 equal force, you cannot possibly throw the Wood so far as the Stone or Iron.

It is certain (as it hath been formerly in part touched) that Water may be the Medium of Sounds. If you dash a Stone against a Stone in the bottom of the Water, it makes a Sound; so a long Pole struck upon Gravel, in the bottom of the Water, maketh a Sound. Nay, if you should think that the Sound cometh up by the Pole, and not by the Water, you shall finde that an Anchor let down by a Rope maketh a Sound; and yet the Rope is no solid Body, whereby the Sound can ascend.

All objects of the Sort which are very offensive, do cause the Spirits to retire; and upon their flight, the parts are in some degree defined, and so there is induced in them a trepidation and horror. For Sounds, we see that the grating of a Saw, or any very harsh noise, will set the Teeth on edge, and make all the Body shiver. For Taftes, we see, that in the taking of a Potion, or Pills, the Head and the Neck shake. For odious smells, the like effect followeth, which is less perceived, because there is a remedy at hand, by stopping the Nose. But in Horses, that can use no such help, we see the finell 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 Sun suddenly into a shade, there followeth a chillness or shivering in all the Body. And even in Sight, which hath (in effect) no odious object, coming into sudden darkness, induceth an offer to shiver.

There is in the City of Tuscum in Italy, a Church that hath Windows only from above; it is in Length an hundred Feet, in Bredth twenty Feet, and in Height near fifty, having a Door in the midst. It reporteth, the
the voice twelve or thirteenth times. If you stand by the close end-wall over against the Door, the Echo fades and dies by little and little, as the Echo at Pom-Charrenon doth, and the voice sounds as if it came from above the Door; and if you stand at the lower end, or on either side of the Door, the Echo holdeth; but if you stand in the Door, or in the midst just ever against the Door, not. Note, that all Echoes sound better against old Walls than new, because they are more dry and hollow.

The 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 four or alive things, which let the Teeth on edge, this object tainteth the imagination; so that he that eateth the thing done by another, hath his own Teeth also set on edge. So if a man see another turn swiftly and long, or if he look upon Wheels that turn, himself waxeth Turn-sick. So if a man be upon a high place, without Rails, or good hold, except he be used to it, he is ready to fall: for imagining a fall, it putreth his spirits into the very action of a fall. So many upon the seeing of others Bleed, or Strangled, or Tortured, themselves are ready to faint, as if they bled, or were in strife.

Take a Stick-Gilliflower, and tie it gently upon a stick, and put them both into a Stoop-glass full of Quick-silver, so that the Flower be covered; then lay a little weight upon the top of the Glafs, that may keep the stick down; and look upon them after four or five days, and you shall finde the Flower fresh, and the Stalk harder and less flexible then it was. If you compare it with another Flower, gathered at the same time, it will be the more manifest. This sheweth, that Bodies do preserve excellently in Quick-silver; and not preserve onely, but the coldness of the Quick-silver, indurate. For the freshness of the Flower may be more clearly Conspicuation, (which is the more to be observed, because the Quick-silver preserveth the Flower) but the stiffness of the Stalk cannot be without Induration from the cold (as it seemeth) of the Quick-silver.

It is reported by some of the Ancients, That in Cypr there is a kind of Iron, that being cut into little pieces, and put into the ground, if it be well watered, will encrease into greater pieces. This is certain, and known of old, that Lead will multiply and encrease; as hath been seen in old Statues of Stone, which have been put in Cellars, the Feet of them being bound with Leaden bands; where (after a time) there appeared, that the Lead did swell, innumerable, as it hanged upon the Stone like Warts.

I call that drowning of Metals, when the baser Metal is so incorporate with the more rich, as it can by no means be separated again; which is a kind of Version, though false; as if Silver should be inseparably incorporated with Gold, or Copper and Lead with Silver. The Ancient Electrum had in it a fifth of Silver to the Gold, and made a Compound Metal, as fit for most uses as Gold, and more resplendent, and more qualified in some other properties; but then that was easily separated. This do privily, or to make the Compound pafs for the rich Metal simple, is an adulteration or counterfeiting; but if it be done avowedly and without disguising, it may be a great faving of the richer Metal. I remember to have heard of a man skillful in Metals, that a fifteenth part of Silver incorporate with

Gold
Gol'd is the onely Substance which hath nothing in it Volatile, and yet melteth without much difficulty. The Melting fheweth, that it is not jejune or scarce in Spirit. So that the fixing of it is not want of Spirit to flee out, but the equal freedging of the Tangible parts, and the close concervation of them; whereby they have the less appetite, and no means (at all) to issue forth. It were good therefore to try whether Glass Re-molten, do lose any weight; for the parts in Glass are evenly spread, but they are not to close as in Gold; as we fee by the cafe admission of Light, Heat, and Cold, and by the smallness of the weight. There be other Bodies fixed, which have little or no Spirit, to as there is nothing to flee out; as we see in the Stuff, whereof Coppels are made, which they put into Furnaces, upon which Fire-work eth not. So that there are three caufes of Fixation: the Even-spread both of the Spirits and Tangible parts; the Clofure of the Tangible parts; and the Jejunum of Exeveal Communion of Spirits: Of which three, the two firft may be joined with a Naure Liquefiable, the last not.

It is a profound Contemplation in Naure, to confider the Emptines of (as we may call it) or Infatisfaction of several Bodies; and of their appetite to take in others. Air taketh in Lights, and Sounds, and Smells, and Vapors: And it is most manifest, that it doth it with a kinde of Thirst, as not satisfied with his own former Contentence; for else it would never receive them in fo suddenly and easilie. Water and all Liquors do hastily receive dry and more Terrestrial Bodies proportionable; and Dry Bodies, on the other side, drink in Waters and Liquors: So that (as it was well said by one of the Ancients, of Earthy and Watry Substances) one is a Glue to another. Parchments, Skins, Cloth, &c. drink in Liquors; though themselves be entire Bodies, and not comminuted, as Sand and Ashes, nor apparently porous. Metals themselves do receive in readily Strong waters, and Strong waters likewise do readily pierce into Metals and Stones; and that Strong water will touch upon Gol'd, that will not touch upon Silver, and conversely. And Gol'd, which seemeth by the weight to be the clorefl and most solid Body, doth greedily drink in Quicksilver. And it seemeth, that this Reception of other Bodies is not violent; for it is (many times) reciprocal, and as it were, with content. Of the caufe of this, and to what Axiom it may be referred, confider attentively; for as for the pretty aflertion, That Matter is like a Common Strumpet that defiresh all Forms, it is but a Wandering Notion. Onely Flame doth not content it felf to take in any other Body; but either to overcome, and turn another Body into it felf, as by victory, or itself to die and go out.

799. Experiment Solitary, touching Fixation of Bodies.
T is certain, That all Bodies whatsoever, though they have no Sense, yet they have Perception: For when one Body is applied to another, there is a kind of Election, to embrace that which is agreeable, and to exclude or expel that which is ingrate: And whether the Body be altered or altered, evermore a Perception precedeth Operation; for else all Bodies would be alike one to another. And sometimes this Perception in some kind of Bodies is far more subtle than the Sense; so that the Sense is but a dull thing in comparison of it. We see a Weather-glass 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 upon the touch; as when the Lead-shot draweth Iron, or Flame fireth Naphtha of Babylon a great distance off. It is therefore a subject of a very Noble Enquiry, to enquire of the more subtle Perceptions: for it is another Key to open Nature, as well as the Sense, and sometimes better: And besides, it is a principal means of Natural Divination; for that which in these Perceptions appeareth early, in the great effects cometh long after. It is true also, that it serveth to discover that which is hid, as well as to foretell that which is to come, as it is in many subtle Trials: As to try whether Seeds be old or new, the Sense cannot inform; but if you boil them in Water, the new Seeds will sprout sooner. And so of Water, the taste will not discover the best Water; but the speedy consumin of it, and many other means which we have heretofore set down, will discover it. So in all Physiognomy, the Lineaments of the Body will discover those Natural Inclinations of the Mind, which Dissimulation will conceal, or Discipline will suppress. We shall therefore now handle onely those two Perceptions which pertain to Natural Divination and Discovery, leaving the handling of
Perception in other things to be disposed elsewhere. Now it is true, that Divination is attained by other means; as if you know the Concomitants, you may judge of the effect to follow; and the like may be laid of Discovery. But we try our selves here to that Divination and Discovery chiefly, which is caused by an early or subtle Perception.

The aptness or propension of Air or Water to corrupt or putrefy, (no doubt) is to be found before it break forth into manifest effects of Diles, Blasting, or the like. We will therefore set down some Prognosticks of Pestilential and unwholesome years.

The Wind blowing much from the South without Rain, and Worms in the Oak-Apple, have been spoken of before. Also the plenty of Frogs, Grasshoppers, Flies, and the like Creatures bred of Putrefaction, both portend Pestilential years.

Great and early Heats in the Spring, (and namely in May) without Winds, portend the same. And generally do years with little Wind or Thunder.

Great Droughts in Summer, lastin till towards the end of August, and some gentle showers upon them, and then some dry weather again, do portend a Pestilential Summer the year following: For about the end of August, all the sweetness of the Earth which goeth into Plants or Trees is exhaled; (and much more if the August be dry) so that nothing then can breath forth of the Earth but a gros vapor, which is apt to corrupt the Air; and that vapor by the first showers, if they be gentle, is released, and cometh forth abundantly. Therefore they that come abroad soon after those showers are commonly taken with sickness. And in a sick no Body will sit out of doors after the first showers. But if the first showers come vehemently, then they rather wash and fill the Earth, then give it leave to breath forth presently. But if dry weather come again, then it fixeth and continueth the corruption of the Air upon the first showers begun, and maketh it of ill influence even to the next Summer, except a very Frosty Winter discharge it, which seldom succedeth such Droughts.

The lesser Infections of the Small-Pox, Purple Fever, Agues in the Summer precedent, and hovering all Winter, do portend a great Pestilence in the Summer following: For Putrefaction doth not rise to its height at once.

It were good to lay a piece of raw Flesh or Fish in the open Air; and if it putrefy quickly, it is a sign of a disposition in the Air to Putrefaction. And because you cannot be informed, whither the Putrefaction be quick or late, except you compare this Experiment with the like Experiment in another year; it were not amiss in the same year, and at the same time, to lay one piece of Flesh or Fish in the open Air, and another of the same kinde and bigness within doors: For I judge, that if a general disposition be in the Air to putrefy, the Flesh or Fish will sooner putrefy abroad, where the Air hath more power then in the House, where it hath lefs, being many ways corrected. And this Experiment would be made about the end of March; for that season is likeliest to discover what the Winter hath done, and what the Summer following will do upon the Air. And because the Air (no doubt) receiveth greattinture and infusion from the Earth, it were good to try that expofing of Flesh or
or Fifth both upon a Stake of Wood, some height above the Earth, and upon the flat of the Earth.

Take May Dew, and see whether it putrefy quickly, or no; for that likewise may decree the quality of the Air, and vapor of the Earth, and when or else corrupted.

A dry March, and a dry May, portend a wholesome Summer, if there be a showing April between; but otherwise, it is a sign of a Presidential year.

As the discovery of the disposition of the Air is good for the prognosticks of wholesome and unwholesome years; so it is of much more use for the choice of places to dwell in; as the least for Lodges and Retiring-places for Health, (for Mansions-Houses respect provisions as well as health) wherein the Experiments above mentioned may serve.

But for the choice of Places or Seats, it is good to make tryal, not only of appliances of Air to corrupt, but also of the moisture and dryness of the Air, and the temper of it in heat or cold; for that may concern Health diversely. We see that there be some Houses wherein Sweet Must will retent, and Baked Mews will mould, more than in others; and Wainscots will also sweat more, so that they will almost run with Water: At which (no doubt) are caused chiefly by the moistness of the Air in those Seats. But because it is better to know it before a Man buildeth his House, then to finde it after, take the Experiments following.

Lay Wool, or a Sponge, or Bread in the place you would try, comparing it with some other places, and see whether it doth not moisten, and make the Wool or Sponge, &c. more ponderous than the other: And if it do, you may judge of that place, as situate in a dross and moist Air.

Because it is certain that in some places, either by the Nature of the Earth, or by the situation of Woods and Hills, the Air is more unequal then in others; and inequality of Air is ever an enemy to Health. It were good to take two Weather-Glasses, marches in all things, and to set them for the same hours of one day in several places where no shade is nor enclosures; and to mark when you frequented, how far the Water cometh; and to compare them when you come again, how the Water standeth then. And if you finde them unequal, you may be sure, that the place where the Water is lowest is in the warmer Air, and the other in the Colder. And the greater the inequality is of the ascent or descent of the Water, the greater is the inequality of the temper of the Air.

The Predictions likewise of cold and long Winters; and hot and dry Summers, are good to be known, as well for the discovery of the caués, as for divers Provisions. That of Plenty of Haws, and Hebs, and Bryar-Berries, hath been spoken of before. If Wainscot or Stone, that have used to sweat, be more dry in the beginning of Winter, or the drops of the Eaves of Houses come more slowly down then they use, it portendeth a hard and frosty Winter. The cause is, for that in the weather an inclination of the Air to dry Weather, which in Winter is ever joyned with Frost.

Generally a moist and a cool Summer, portendeth a hard Winter. The cause is, for that the vapors of the Earth are not dissipated in the Summer by the Sun; and so they rebound upon the Winter.

A hot and dry Summer and Autumn, and especially if the heat and drought extend far into September, portendeth an open beginning of Winter, and colds to succeed toward the latter part of the Winter, and the beginning of the Spring. For till then the former heat and drought bear the sway, and the vapors are not sufficiently multiplied.
Natural History

An open and warm Winter portendeth a hot and dry Summer: For the Vapors diuerge into the Winter Showers; whereas Cold and Frost keep
them in, and transporteth them into the late Spring and Summer follow-
ing.

Birds that use to change Coutrieys at certain Seasons, if they come earlier, do shew the temperature of Weather according to that Coutriey
whence they came: As the Winter Birds, (namely, Woodcocks, Ploides, &c.)
if they come earlier, and out of the Northern Coutrieys, with us shew cold
Winters. And if it be in the same Coutriey, then they shew a temperature
of Season, like unto that Season in which they come; as Swallowes, Bus, Cuckees, &c. that come towards Summer, if they come early, shew a hot
Summer to follow.

The Prognosticks more immediate of Weather to follow soon after, are
more certain then those of Seasons: The Refounding of the Sea upon the
Shore, and the Mumur of Winds in the Woods, without apparent Wind, shew Wind to follow. For such Winds, breathing chiefly cut of the Earth;
are not at the first perceived, except they be pent by Water or Wood. And
therefore a Mumur out of Caves likewise portendeth as much.

The Upper Regions of the Air, perceive the Collection of the matter of
Tempests and Winds before the Air here below. And therefore the obsieving
of the smaller Stars, is a sign of Tempests following. And of this kinde you
shall finde a number of instances in our Inquisition de Venus.

Great Mountains have a Perception of the disposition of the Air to Tem-
pests sooner, then the Valleys or Plains below. And therefore they say in Wales,
When certain Hills have their Night-caps on, they mean mischief. The cause is, for that
Tempests which are for the most part bred above in the Middle Region, (as they call it) are soonest perceived to collect in the places next it.

The Air and Fire have subtle Perceptions of Wind rising before Men
find it. We see the trembling of a Candle will discover a Wind, that other-
wise we do not feel; and the Flesious burning of Flames doth shew the Air
beginneth to be unquiet; and so do Coals of fire, by casting off the ashes
more then they use. The cause is, for that no Wind at the first, till it hath
struck and driven the Air, is apparent to the Sense; but flame is easier to
move then Air. And for the Ashes, it is no marvel though Wind unperceived
shake them off; for we usually try which way the Wind bloweth, by calling
up Gras or Chaff, or such light things into the Air.

When Wind expirith from under the Sea, as it causeth some reflexions of the Water, (whereof we spake before) so it causeth some light move-
tions of Bubbles, and white Circles of Froth. The cause is, for that the
Wind cannot be perceived by the Sense, until there be an Eruption of a great
quantity from under the Water, and so itgetherto into a Body, whereas in the
first putting up, it cometh in little portions.

We spake of the Ashes that Coals cast off, and of Gras and Chaff car-
rried by the Wind; to any light thing that moveth when we find no Wind,
through a VVind at hand: As when Feathers or Down of Thistles flie to and
from in the Air.

For Prognosticks of VVheather from Living Creatures, it is to be noted, That
Creatures that live in the open Air (sub dio) must needs have a quicker
impression from the Air, then Men that live most within doors; and espe-
cially Birds who live in the Air freeest and clearest, and are aptest by their
voice to tell tales what they finde, and likewise by the motion of their
flight to express the same.
Water-fowls (at Sea-Gulls, Moor-Hens, &c.) when they flock and file together from the sea towards the Shores; and contrariwise Land Birds, (as Crows, Swallows, &c.) when they file from the Land to the VVaters, and beat the VVaters with their VVings, do foretell Rain and VVind. The cause is, Pleasure that both kindes take in the moistnets and density of the Air, and so desire to be in motion, and upon the VVings, whither-ever they would otherwise go: For it is no marvel that VVater-fowl do joy most in that Air which is liket VVaters; and Land Birds also (many of them) delight in Bithing and moist Air. For the same reason also, many Birds do prance their Feathers, and Geele do gagle, and Crows seem to call upon Rain. All which is but the comfort they seem to receive in the relenting of the Air.

The Heron when she soareth high, (so as sometimes she is seen to pass over a Cloud) sheveth VVinds: But Kites flying aloft, chew fair and dry weather. The cause may be, for that they both mount moist into the Air of that temper wherein they delight. And the Heron, being a VVater-fowl, taketh pleasure in the Air that is condensed; and besides, being but heavy of VVing, needeth the help of the greater Air. But the Kite affecteth not so much the grostlaff of the Air, as the cold and freshness thereof; for being a Bird of Prey, and therefore hot, the delighteth in the fresh Air, and (many times) fliest against the VVind; as Trouts and Salmons swim against the stream. And yet it is true also, that all Birds finde an ease in the depth of the Air, as Swimmers do in a deep VVater. And therefore when they are also, they can uphold themselves with their VVings speed, scarce moving them.

Fishes when they play towards the top of the VVater, do commonly foretell Rain. The cause is, for that a Fish hating the dry, will not approach the Air till it groweth moist; and when it is dry will fle it, and swim lower.

Bealls do take comfort (generally) in a moist Air, and it maketh them eat their Mear better; and therefore Sheep will get up bimes in the morning to feed against Rain; and Cattle, and Deer, and Coney's will feed hard before Rain; and a Heifer will put up his Nose, and snuff in the Air against Rain.

The Trisail against Rain, swelleth in the Stalk, and so standeth more upright; for by wet, Stalks do erect, and Leaves bow down. There is a small Red Flower in the Stubble-fields, which Country people call the Wine-pipe; which, if it open in the Morning, you may be sure of a fair day to follow.

Even in Must, Aches, and Hurts, and Corns, do engravish either towards Rain, or towards Frost; for the one maketh the Humors more to abound, and the other maketh them sharper. So we see both extremities bring the Gout.

Worms, Vermine, &c. do foretrow (likewise) Rain; for Earth-Worms will come forth, and Moles will call up more, and Fleas bite more against Rain.

Solid Bodies likewise foretrow Rain: As Stones and Wainscot when they swear, and Boxes and Pegs of Wood when they draw and wind hard; though the former be but from an outward cause, for that the Stone or Wainscot turneth and beareth back the Air against itself; but the latter is an inward dwelling of the Body of the VWood it self.
Experiment Solitary, touching the Nature of Appetite in the Stomack.

Appetite is moved chiefly by things that are cold and dry. The cause is, for that Cold is a kind of indigence of Nature, and calleth upon supply, and to is Dryness: And therefore all four things (as Vinegar, [Juice of Lemons, Oil of Violets, &c.) provoke Appetite. And the Difference which they call

Appetus Causus, consisteth in the Matter of an Acid and Glacce Phlegm in the Mouth of the Stomack. Appetit is also moved by four things, for that four things induce a contraction in the Nerves, placed in the Mouth of the Stomack, which is a great cause of Appetite. As for the cause why Onions, and Salt, and Pepper in Baked Meats move Appetite, it is by Vehicitation of those Nerves; for Motion wheteth. As for "Wormwood, Olives, Capers, and others of that kind, which participate of Bitterness, they move Appetite by Abstention. So as there be four principal causes of Appetite; the Refrigeration of the Stomach joyned with some Dryness, Contraction, Vehicitation, and Abstention; besides Hunger, which is an emptiness; and yet overfalling doth (many times) cause the Appetite to cease; for that want of Meat maketh the Stomach draw Humors, and such Humors as are light and Cholerick, which quench Appetite most.

It hath been observed by the Ancients, that where a Rainbow seemeth to hang over, or to touch, there breatheth forth a sweet smell. The cause is, for that this happeneth but in certain matters which have in themselves some Sweetness, which the gentle Dew of the Rainbow doth draw forth; and the like do soft Showers, for they also make the Ground sweet: But none are so delicate as the Dew of the Rainbow where it falleth. It may be, also, that the Water itself hath some Sweetness; for the Rainbow consisteth of a Glomeration of small drops, which cannot possibly fall but from the Air that is very low, and therefore may hold the very Sweetness of the Herbs and Flowers as a Distilled Water: For Rain and other Dew that fall from high cannot preserve the smell, being dissipate in the drawing up; neither do we know, whether some Water it itself may not have some degree of Sweetness. It is true, that we finde it sensibly in no Pool, River, nor Fountain; but good Earth newly turned up, hath a freshness and good scent; which Water, if it be not too equal, (for equal objects never move the Sense) may also have. Certain it is, that Bay leaf, which is but a kind of Water congealed, will sometimes smell like Violets.

Sweet Smells, heat is requisite to concoct the Matter, and some Moisture to spread the Breath of them: For heat, we see the Wood and Spices are more odorate in the Hot Countries, then in the Cold. For Moisture, we see that things too much dryd lose their Sweetness; and Flowers growing better in a Morning or Evening, than at Noon. Some sweet Smells are destroyed by approach to the Fire; as Violets, Wall-flowers, Gillflowers, Pinks, and generally all Flowers that have cool and delicate Spirits. Some continue both on the fire, and from the fire, as Rose-water, &c. Some do scarce come forth, or at least no so pleasantly, as by means of the fire; as Juniper, Sweet Gums, &c. and all smells that are enclosed in a fast Body; but (generally) those smells are the most grateful where the degree of heat is small, or where the strength of the smell is alloyed; for these things do rather wo the Sense, then fatiate it. And therefore the smell of Violets and Roses exceedeth in sweetnefs that of Spices; and Gums, and the strongest sort of smells, are best in a west afar off.
It is certain, that no small influxeth but with emission of some corporeal substance; not as it is in Lights, and Colours, and Sounds: For we see plainly that smell doth predominate nothing that distance that the other do. It is true, that some Woods of Oranges, and Heaths of Rosermerry, will smell a great way into the Sea, perhaps twenty Miles; but what is that, since a peal of Ordnance will do as much, which moveth in a small compass, whereas those Woods and Heaths are of vast spaces? Besides, we see that smells do adhere to hard Bodies; as in perfuming of Gloves, &c. which smell through corporeal; and do last a great while, which Sounds and Light do not.

The Excrements of most Creatures smell ill, chiefly to the same Creature that voideth them: For we see, besides that of Man, that Pigeons and Horses thrive best, if their Houset and Stables be kept sweet, and so of Cage-Birds; and the Cat burieth that which the voideth. And it holdeth chiefly in those Beasts which feed upon Flesh. Dogs (almost) only of Beasts delight in fetide odors; which smell there is somewhat in their sense of smell differing from the smells of other Beasts. But the cause why Excrements smell ill is manifest, for that the Body it self rejecteth them, much more the Spirits; And we see, that those Excrements that are of the first digestion smell the worst, as the Excrements from the Belly; those that are from the second digestion, fels ill, as Urine; and those that are from the third, yet fels; for Sweat is not to bad as the other two, especially of some persons that are full of heat. Likewise most Putrefactions are of an odious smell, for they smell either fertile or mouldy. The cause may be, for that Putrefaction doth bring forth such a constittance as is most contrary to the constittance of the Body whilst it is found, for it is a mere dissolution of that form. Besides, there is another reason, which is profound: And it is, That the objects that please any of the senses, have (all) some equality, and (as it were) order in their composition, but where those are wanting the object is ever ingrate. So mixture of many disagreeing colors is never unpleasant to the Eye: Mixture of discordant Sounds is unpleasant to the Ear; mixture of hotch-potch of many tastes is unpleasant to the taste; harshness and ruggedness of Bodies is unpleasant to the touch. Now it is certain, that all Putrefaction, being a dissolution of the first form, is a mere confusion, and unformed mixture of the part. Nevertheless, it is strange, and seemeth to cross the former observation, that some Putrefactions and Excrements do yield excellent Odors; as Civis and Musk, and, as some think, Amber-greens, for divers take it (though unprobably) to come from the Sperm of Fish; and the Mols we spake of from Apple-trees is little better then an Excretion. The reason may be, for that there palfeth 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 joyned with a further caufe, which is more subtle; and it is, that the Senses love not to be over-pleased, but to have a commixture of somewhat that is in itself ingrate. Certainly, we see how Discords in Musick, falling upon Conords, make the sweetest Strains: And we see again what strange tales delight the tales; as Red-berrings, Caviare, Parmesan, &c. And it may be the same holdeth in smells. For those kinds of smells that we have mentioned are all strong, and do pull and velificate the Sense. And we finde also, that places where men Urine commonly have some smell of Violets. And Urine, if one hath eaten Nutmeg, hath not.
The florishful, general, and indefinite Contemplations and Notions of the Elements, and their Conjugations of the Influences of Heaven, of Hot, Cold, Moisture, Drought, Qualities Active, Passive, and the like, have swallow-ed up the true Passages, and Process, and Affects, and Consequences of Matter, and Natural Bodies. Therefore they are to be set aside, being but notional, and ill limited: and definite axioms are to be drawn out of measured instances, and so asent to be made to the more general axioms by Scale. And of these kinds of Process of Nature, and Characters of Matter, we will now set down some instances.

All Putrefactions come chiefly from the inward Spirits of the Body, and partly also from the Ambient Body, be it Air, Liquor, or whatsoever else. And this last, by two means; either by ingress of the substance of the Ambient Body into the Body putrefied, or by excitation and solicitation of the Body putrefied, and the parts thereof, by the Body Ambient. As for the received opinion, that Putrefaction is called either by Cold, or Peregrine and Preternatural Heat, it is but negation: For Cold in things inanimate, is the greatest enemy that is to Putrefaction, though it extinguisheth Vivification, which ever consilteth in Spirits attenuate, which the Cold doth congeal and coagulate. And as for the Peregrine heat, it is thus far true. That it the proportion of the Adventive heat, be greatly predominant to the Natural heat, and Spirits of the Body, it tendeth to dissolution, or notable alteration. But this is wrought by mission, or Suppression, or Suppression of the Native Spirits, and also by the Dihoration and Discomposure of the Tangible parts, and other passages of Nature, and not by a conflict of Heats.

In versions or main Alterations of Bodies, there is a Medium between the Body, as it is at first, and the Body refulting; which Medium is Corpus imperfecti Mistum, and is transitory, and not durable: as Mists Smoaks vapors, Chilos in the Stomack, Living Creatures in the first Vivification; and the middle action which produceth such Imperfect Bodies, is fitly called (by some of the Ancients) Inquisition or Inconsolation, which is a kinde of Putrefaction; for the parts are in confusion till they settle one way or other.

The word ConsoHon or Digestion, is chiefly taken into use from Living Creatures, and their Organs, and from thence extended to Liquors and Fruits, &c. Therefore they speak of Meat concocted, Urine and Excrements concocted; and the Four Digestions (in the Stomack, in the Liver, in the Arteries and Nerves, and in the several parts of the Body) are likewise called ConsoHon, and they are all made to be the works of Heat. All which notions are but ignorant catches of a few things which are most obvious to Mens observations. The constantest notion of ConsoHon is, that it should signify the degrees of alteration of one Body into another, from Crudity to Perfect ConsoHon, which is the ultimity of that action or process. And while the Body to be converted and altered is too strong for the efficient that should convert or alter it (whereby it resiteth, and holdeth faft in some degree the first Form or Consistence) it is (all that while) Crudity and InconsoHt, and the Process is to be called Crudity and InconsoHon. It is true, that ConsoHon is in great part the work of Heat; but not the work of Heat alone: For all things that further the Conversion or Alteration (as Refh, Mixture of a Body already concocted, &c.) are also means to ConsoHon. And there
there are of Concoction two Periods; the one Assimilation, or absolute Conversion and Subduction; the other Maturation: Whereof, the former is most conspicuous in the Bodies of Living Creatures, in which there is an Absolute Conversion and Assimilation of the Nourishment into the Body, and likewise in the Bodies of Plants; and again in Metals, where there is a full Transmutation. The other (which is Maturation) is seen in Liquors and Fruits; wherein there is not desir'd, nor pretended, an utter Conversion, but only an Alteration to that Form which is most sought for Mans use, as in Clarifying of Drinks, Ripening of Fruits, &c. But note, that there be two kinds of Absolute Conversions. The one is, when a Body is converted into another Body which was before; as when Nourishment is turned into Flesh: That is it which we call Assimilation. The other is, when the Conversion is into a Body morely new, and which was not before; as if Silver should be turned to Gold, or Iron to Copper. And this Conversion is better called, by distinction like, Transmutation.

Here are also divers other great alterations of Matter and Bodies, besides those that tend to Concoction and Maturation; for whatsoever doth so alter a Body, as it returneth not again to that it was, may be called Alteratio Major: As when Meat is Boiled, or Roasted, or Fried, &c. or when Bread and Meat are Baked; or when Cheese is made of Curds, or Butter of Cream, or Coals of Wood, or Bricks of Earth; and a number of others. But to apply Notions Philosophical to Plébian Terms; or to say, where the Notions cannot fitly be reconciled, that there wanteth a Term or Nomenclature for it, (as the Ancients used) they be but shifts of Ignorance: For Knowledge will be ever a Wandering and Indigested thing, if it be but a commixture of a few Notions that are at hand, and occur, and not excited from sufficient number of instances, and those well collated.

The Consequences of Bodies are very divers: Dense, Rare, Tangible, Pneumatical; Volatile, Fixed; Determinate, not Determinate; Hard, Soft; Cleaving, not Cleaving; Congelable, not Congelable; Liquefiable, not Liquefiable; Fragile, Tough; Flexible, Inflexible; Tradable, or to be drawn forth in length, Imbrabile; Porous, Solide; Equal and Smooth, Vagaual; Venous and Fibrous, and with Grains, Enire, and divers others. All which to refer to Heat and Cold, and Moisture and Drouught, is a Compendious and Inutile Speculation. But of these see principally our Abecedarium Nature, and otherwise 'sarfum in this our Sylva Sylvanum. Nevertheless, in some good part, we shall handle divers of them now prefently.

Liquefiable and not Liquefiable proceed from these causes. Liquefaction is ever caused by the Detention of the Spirits, which play within the Body, and open it. Therefore such Bodies as are more Turgid of Spirit, or that have their Spirits more straitly imprisoned, or again, that hold them better pleased and content, are Liquefiable: For the three Dispositions of Bodies do arrest the Emission of the Spirits. An example of the first two Properties is in Metals, and of the last in Grease, Pitch, Sulphur, Butter, Wax, &c. The Disposition not to Liquefie, proceedeth from the easie Emission of the Spirits, whereby the grosser parts contract; and therefore Bodies jument of Spirits, or which part with their Spirits more willingly, are not Liquefiable; as Wood, Clay, Freestone, &c. But yet even many of those Bodies that will not melt, or will hardly melt, will notwithstanding often; as Iron in the Forge,
Forget, and a Stick bathed in hot Ashes, which whereby become more flexible. Moreover, there are some Bodies which do Liquefy or dissolve by Fire; as Metals, Wax, &c. and other Bodies which dissolve in Water, as Salt, Sugar, &c. The cause of the former proceedeth from the Dilatation of the Spirits by Heat: The cause of the latter proceedeth from the opening of the Tangible Parts, which desire to receive the Liquor. Again, there are some Bodies that dissolve with both; as Gum, &c. And those be such Bodies as on the one side have good store of Spirit, and on the other side have the Tangible parts indigent of Moisture; for the former helpeth to the dilating of the Spirits by the Fire, and the latter stimulateth the parts to receive the Liquor.

O of Bodies some are Fragile, and some are Tough and not Fragile; and in the breaking, some Fragile Bodies break but where the force is, some shatter and file in many pieces. Of Fragility, the cause is an impotency to be extended; and therefore Stone is more Fragile then Metal; and so Fiatile Earth is more Fragile then Crude Earth, and Dry Wood than Green. And the cause of this unaptnefs to Extension, is the small quantity of Spirits (for it is the Spirit that furtherteth the Extension or Dilatation of Bodies;) and it is ever concomitant with Porosity, and with Drinms in the Tangible parts. Contrariwise, Tough Bodies have more Spirits, and fewer Pores, and Moifter Tangible parts: Therefore we see, that Parchment or Leather will stretch, Paper will not; Woollen-Cloth will tenter, Linnen fearcely.

All Iolid Bodies consist of Parts of two several Natures; Pneumatical, and Tangible: And it is well to be noted, that the Pneumatical Substanee is in some Bodies, the Native Spirit of the Body; and in some other, plain Air that is gotten in; as in Bodies deficate, by Heat, or Age: For in them, when the Native Spirit goeth forth, and the Moiture with it, the Air with time getteth into the Pores. And thofe Bodies are ever the more Fragile; for the Native Spirit is more Yielding and Extensive (especially to follow the Parts) than Air. The Native Spirits also admit great diversity; as Hot, Cold, Active, Dull, &c. Whence proceed moft of the Vertues, and Qualities (as we call them) of Bodies: But the Air intermixt, is without Vertues, and maketh things insipid, and without any extimulion ion.

The Concretion of Bodies is (commonly) solved by the contrary; as Ice, which is concealed by Cold, is dissolved by Heat; Salt and Sugar, which are excoced by Heat, are dissolved by Cold and Moiture. The cause is, for that these operations are rather returns to their former Nature, than alterations; fo that the contrary cureth. As for Oyl, it doth neither easily conceal with Cold, nor thicken with Heat. The cause of both Effects, though they be produced by contrary efficient, seemeth to be the same; and that is, because the Spirit of the Oyl, by either means, exhaled 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 conceal them: As when Ice is concealed in a Cup, the Ice will swell instead of contracting, and sometimess rift.
OF Bodies, some (we see) are hard, and some soft: The hardness is caused (chiefly) by the Jesuanets of the Spirits; and their impurity with the Tangible parts: Both which, if they be in a greater degree, maketh them not only hard, but fragile, and les enduring of prelurces, as Steel, Stone, Glass, Dry Wood, &c. Softness cometh (contrariwise) by the greater quantity of Spirits, (which ever helpeth to induce yielding and effusion;) and by the more equal spreading of the Tangible parts, which thereby are more filling, and following; as in Gold, Lead, Wax, &c. But note, that soft Bodies (as we use the word) are of two kindes; the one, that easily giveth place to another Body, but alteration not Bulk by rising in other places: and therefore we see that Wax, if you put anything into it, doth not rise in Bulk, but only given place: For you may not think, that in Printing of Wax, the Wax riseth up at all; but only the depressed part giveth place, and the other remaineth as it was. The other that alteration Bulk in the Cesslion, as Water, or other Liquors, if you put a Stone, or anything into them, they give place (indeed) easily, but then they rise all over; which is a false Cesslion, for it is in place, and not in Body.

Al Bodies Dullible, and Tenstle, (as Metals) that will be drawn into Wires; Wool, and Tow that will be drawn into Yarn or Thred; have in them the Appetite of Not discontinuing, strong; which maketh them follow the force that pulleth them out; and yet so, as not discontinueth or forsaile their own Body. Vicious Bodies (likewile) as Pitch, Wax, Birdline, Cheesefoaltd, will draw forth and roep. But the difference between Bodies fibrous, and Bodies vicious, is plain: For all Wool; and Tow, and Cotton, and Silk (especiallly raw Silk) have, besides their desire of continuance, in regard of the tenue of their Thred, a greediness of Moisture, and by Moisture to joyn and incorporate with other Thred, especially, if there be a little Wrenching, as appeareth by the twisting of Thred, and the practice of Twirling about of Spindles. And we see also, that Gold and Silver Thred cannot be made without Twirling.

The differences of impossible, and not impossible; figurable, and not figurable; mouldable, and not mouldable; feasible, and not feasible; and many other Passions of Matter, are Plebeian Notions, applied unto the Instruments and Utts which Men ordinarily practice; but they are all but the effects of some of these causes following, which we will enumeratet without applying them, because that would be too long. The first is the Cesslion, or not Cesslion of Bodies, into a smaller space, or room, keeping the outward Bulk, and not flying up. The second is, the stronger or weaker Appetite, in Bodies, to continuity, and to the discontinuity. The third is, the disposition of Bodies, to contract, or not contract; and again, to extend, or not extend. The fourth is, the small quantity, or great quantity of the Pneumatical in Bodies. The fifth is, the nature of the Pneumatical, whether it be Native Spirit of the Body, or common Air. The sixth is, the Nature of the Native Spirits in the Body, whether they be Active, and Eager, or Dull, and Gentle. The seventh is, the emission or detension of the Spirits in Bodies. The eighth is, the dilatation or contraction of the Spirits in Bodies, while they are detained. The ninth is, the collocation of the Spirits in Bodies, whether the collocation be equal or unequal; and again, whether the Spirits be coacervate or diffused. The tenth is, the density or rarity of the Tangible parts.
the eleventh is the Equality or Inequality of the Tangible parts; the twelfth is the Disgellation or Crudity of the Tangible parts; the thirteenth is the Nature of the Matter, whether Sulphureous, or Mercurial, or Watery, or Oily, Dry, and Terrestrial; or Moist and Liquid; which Natures of Sulphureous and Mercurial, seem to be Natures Radical and Principal; the fourteenth is the placing of the Tangible parts, in Length or Tranverse (as it is in the Warp, and the Woot of Textiles); more inward or more outward. &c. The fifteenth is the Porosity or Improportunity betwixt the Tangible parts, and the greatness or smallness of the Pores; the sixteenth is the Collocation and posture of the Pores. There may be more causes, but these do occur for the present.

Take Lead and melt it, and in the midst of it, when it beginneth to congeal, make a little dint or hole, and put Quick-silver wrapped in a piece of Linnen into that hole, and the Quick-silver will fix, and 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 onely to the vapor of the Lead, is less probable. Query, 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 near the Fire.

Sugar hath put down the use of Honey, in so much, as we have lost those observations and preparations of Honey, which the Ancients had, when it was more in price. First, it seemeth, that there was in old time Tree-honey, as well as Bee-honey, which was the Year or Blood issuing from the Tree; inso much, as one of the Ancients relateth, that in Tribes, there was Honey issuing from the Box trees, which made Men mad. Again, in ancient time, there was a kinde of Honey, which either of the own Nature, or by Art, would grow as hard as Sugar, and was not so lusious as ours; they had also a Wine of Honey, which they made thus. They crushed the Honey into a great quantity of Water, and then strained the liquor, after they boiled it in a Copper to the half; then they poured it into Earthen Vessels for a small time, and after turned it into Vessels of Wood, and kept it for many years. If they have also, at this day in Russia, and those Northern Countries, Mead Simple, which (well made and seafoned) is a good wholesome Drink, and very clear. They use also in Wales, a Compound Drink of Mead, with Herbs and Spices. But mean while it was good, in recom pense of that we have lost in Honey, there were brought in use a Sugar-Mead (for so we may call it) though without any mixture at all of Honey; and to brew it, and keep it stale, as they use Mead; for certainly, though it would not be so abstractive, and opening, and solutive a Drink as Mead; yet it will be more grateful to the Stomack, and more lenitive, and fit to be used in sharp Diseases: For we see, that the use of Sugar in Beer and Ale, hath good effects in such cases.

It is reported by the Ancients, that there is a kinde of Steel, in some places, which would polish almost as white and bright as Silver. And that there was in India a kinde of Brass, which (being polished) could scarce be discerned from Gold. This was in the Natural Urne, but I am doubtful, whether Men have sufficiently refined Metals, which we count Bafe: As, whether Iron, Brass, and Tin, be refined to the height? But when they come
come to such a fineness, as serveth the ordinary use, they try no further.

There have been found certain Cement under Earth, that are very soft, and yet taken forth in the Sun, harden as hard as Marble: There are also ordinary Quarries in Somersetshire, which in the Quarry cut soft to any bigness, and in the Building prove firm; and hard.

Living Creatures (generally) do change the Hair with Age, turning to be Gray and White; as is seen in Men, though some earlier, some later; in Horses, that are Dappled and turn White; in Old Squirrels, that turn Grilly, and many others. So do some Birds; as Cygnus from Gray turn White; Hawks from Brown turn more White. And some Birds there be, that upon their Moultling, do turn Colour; as Robin-Redbreast, after their Moultling grow to be Red again by degrees; so do Gold-Finch upon the Head. The cause is, for that Moiſtſure doth (chiefly) colour Hair and Feathers; and Dryneſs turneth them Gray and White; now Hair in Age waxeth Dryer, so do Feathers. As for Feathers, after Moultling, they are young Feathers, and so all one as the Feathers of young Birds. So the Beard is younger than the Hair of the Head, and doth (for the most part) wax hoary later. Out of this ground, 'A Man may devise the Means of altering the colour of Birds, and the Retardation of Hoary Hairs. But of this see the Fifth Experiment.

The difference between Male and Female, in some Creatures, is not to be discerned, otherwise than in the parts of Generation; as in Horses and Mares, Dogs and Bitches, Doves he and she. and others. But some differ in magnitude, and that diversly: For in most the Male is the greater, as in Man, Pheasants, Peacocks, Turkeys, and the like; and in some few, as in Hawks, the Female. Some differ in the Hair and Feathers, both in the quantity, crispation, and colours of them; as He-Lions are Hoarſute, and have great Mains, the She's are smooth like Cats. Bulls are more crisp upon the Forehead than Cows; the Peacock, and Pheasant-cock, and Gold-finch-cock, have glorious and fine colours; the Hens have not. Generally, the he's in Birds have the fairest Feathers. Some differ in divers features, as Buck have Horns, Does none; Rams have more wrinkled Horns than Ewes; Cocks have great Combs and Spurs, Hens little or none; Boars have great Tangs, Sows much less; the Turkey-cock hath great and swelling Gills the Hen hath less; Men have generally deeper and stronger voices than Women. Some differ in faculty, as the Cock among Bunting Birds, are the best Singers. The chief cause of all these (no doubt) is, for that the Males have more strength of heat than the Females; which appeareth manifestly in this, that all young Creatures Male are like Females, and so are Ewes, and Cocks Creatures of all kinds, like Females. Now heat causeth greatness of growth, generally, where there is moiſture enough to work upon: But if there be found in any Creature (which is seen rarely) an over great heat in proportion to the moiſture, in them the Female is the greater; as in Hawks and Sparrows. And if the heat be balanced with the moiſture, then there is no difference to be seen between Male and Female; as in the instancies of Horses and Dogs. We see also, that the Horns of Oxen and Cows, for the most part, are larger than the Bulls, which is caus'd by abundance of moiſture, which in the Horns of the Bull faileth. Again, Heat causeth Pilosity, and Crispation; and likewise Beards in Men. It also expellet
finer moisture, which want of heat cannot expel; and that is the cause of the beauty and variety of Feathers: Again, Heat doth put forth many Excrecences, and much solid matter, which want of Heat cannot do. And this is the cause of Horns, and of the greatness of them; and of the greatness of the Combs, and Spurs of Cocks, Gills of Turkey-Cocks, and Fangs of Boars. Heat also dilateth the Pipes and Organs which caueth the deepness of the Voice. Again, Heat refineth the Spirits, and that caueth the Cock singing Bird to excel the Hen.

There be Fishes greater than any Beasts; as the Whale is far greater than the Elephant. And Beasts are (generally) greater than Birds. For Fishes, the cause may be, that because they live not in the Air, they have not their moisture drawn, and soak'd by the Air, and Sun-Beams. Also they rest always, in a manner, and are supported by the Water; whereas Motion and Labor do consume. As for the greatness of Beasts, more than of Birds, it is caused, for that Beasts stay longer time in the Womb than Birds, and there nourish, and grow; whereas in Birds, after the Egg laid, there is no further growth, or nourishment from the Female; for the hatching doth vivisfe, and not nourish.

We have partly touched before the Means of producing Fruits, without Coars, or Stones. And this we add further, that the cause must be abundance of moisture; for that the Coar, and Stone, are made of a dry Sap: And we see, that it is possible to make a Tree put forth only in Blossom without Fruit; as in Cherries with double Flowers, much more in Fruit without Stones, or Coars. It is reported, that a Cions of an Apple, graft'd upon a Colewort-stalk, fended forth a great Apple without a Coar. It is not unlikely, that if the inward Pith of a Tree were taken out, so that the Juice came only by the Bark, it would work the effect. For it hath been observed, that in Pollards, if the Water get in on the top, and they become hollow, they put forth the more. We add also, that it is delivered for certain by fome, that if the Cions be graft'd, the small ends downwards, it will make Fruit have little or no Coars, and Stones.

Tobacco is a thing of great price, if it be in request. For an Acre of it will be worth (as is affirmed) Two hundred pounds by the year towards charge. The charge of making the Ground, and otherwise, is great, but nothing to the profit. But the English Tobacco hath small credit, as being too dull and earthy: Nay, the Virginia Tobacco, though that be in a hotter climate, can get no credit for the same cause. So that a tryal to make Tobacco more Aromaticall, and better concocted here in England, were a thing of great profit. Some have gone about to do it, by drenching the English Tobacco, in a Deceotion or Infusion of Indian Tobacco. But those are but sophisitations and toyes; for nothing that is once perfect, and hath run his race, can receive much amendment; you must ever refer to the beginnings of things for Melioration. The way of Maturation of Tobacco must (as in other Plants) be from the Hear, either of the Earth, or of the Sun. We see some leading of this in Musk-Melons, which are tawn upon a hot Bed, dunged below, upon a Bank turned upon the South Sun, to give Heat by Reflection; laid upon Tiles, which increaseth the Heat; and covered with Straw, to keep them from Cold; they remove them also, which addeth some Life: And by these helps they become as good in England.
England, as in Italy, or Provincia. These and the like means may be tried in Tobacco. Enquire also of the steeping of Roots, in some such Liquor, as may give them Vigor to put forth strong.

Heat of the Sun, for the Maturity of Fruits; yea, and the heat of Verification of Living Creatures, are both represented and supplied by the heat of Fire; and likewise, the heats of the Sun, and life, are represented one by the other. Trees, set upon the Backs of Chimneys, do ripen Fruit sooner. Vines, that have been drawn in at the Window of a Kitchen, have sent forth Grapes, ripe a month (at least) before others. Stoves, at the Back of Walls, bring forth Orange here with us. Eggs, as is reported by some, have been hatched in the warmth of an Oven. It is reported by the Ancients, that the Eucharist layeth her Eggs under Sand, where the heat of the Sun didclozeth them.

Art in the Boyling sweleth not much; Wheat sweleth more, Rice extremly; insomuch, as a quarter of a Pint (unboiled) will arise to a Pint boiled. The cause (no doubt) is, for that the more clofe and compact the Body is, the more it will dilate. Now Barley is the most hollow, Wheat more solid than that, and Rice most solid of all. It may be also, that some Bodies have a kind of Lentor, and more deportible nature than others; as we see it evident in colouration; for a small quantity of Saffron, will tinct more, than a very great quantity of Birefl, or Wine.

Fruit growth, sweet by Rowling or Pressing them gently with the Hand; as Rowling Peares, Damasks, &c. By Rosennes; as Medlars, Services, Sleet, Heaps, &c. By Time; as Apples, Wardens, Pomegranates, &c. By certain Special Maturations; as by laying them in Hay, Straw, &c. And by Fire; as in Rowling, Squeezing, Baking, &c. The cause of the sweetness by Rowling, and Pressing is, Emollition, which they properly endure; as in bearing of Steakfish, Flesh, &c. By Rosennes is, for that the Spirits of the Fruit, by Purification, gather heat, and thereby dilate the harder part; For in all Purification there is a degree of heat. By Time and Keeping, because the Spirits of the Body, do ever feed upon the tangible parts, and attenuate them. By several Maturations, is, by some degree of heat. And by Fire, because it is the proper work of Heat to refine, and to incorporate; and all four is consummated in some grossness of the Body: And all incorporation doth make the mixture of the Body, more equal, in all the parts, which ever enduedeth a milder taste.

Of Fleshers, some are edible; some, except it be in Famine, not. As those that are not edible, the cause is, for that they have (commonly) too much bitterness of taste; and therefore those Creatures, which are fierce and cholerick, are not edible; as Lions, Vvolvers, Squirrels, Dogs, Foxes, Horses, &c. As for Kine, Sheep, Goats, Deer, Swine, Conneys, Hares, &c. We see they are milde, and fearful. Yet it is true, that Horses which are Beasts of courage, have been and are eaten by some Nations; as the Smyrians were called Hippophae; and the Chinese call Hoss-flesh at this day; and some Gluttons have used to have Colts-flesh baked. In Birds, such as are Canivores, and Birds of Prey, are commonly no good Meat; but the reason is, rather the Cholerick Nature of those Birds, than their Feeding upon Flesh; for Pheas, Gults, Shoreless, Ducks, do feed upon Fleshe, and yet are good.
good Meat. And we see, that those Birds which are of Prey, or fed upon Flesh, are good Meat, when they are very Young; as Hai lks, Beaks, out of the Nest, Owls. Man's flesh is not eaten. The Reasons are three.

First. Because Men in Humanity do abhor it.

Secondly. Because no Living Creature, that die of it self, is good to eat; and therefore the Cannibals (themselves) eat no Man's flesh, of those that die of themselves, but of such as are slain.

The third is. Because there must be generally some disparity between the Nourishment, and the Body nourished; and it must not be overnear, or like: Yet we see, that in great weakneses and Consumptions, Men have been invaused with Woman's Milk. And Pyramus fondly (as I conceive) advised, for the Prolongation of Life, that a Vein be opened in the Arm of some whom some young man, and the blood to be sucked. It is said, that Witches do greedily eat Man's flesh, which if it be true, besides a devilish Appetite in them, it is likely to proceed; for that Man's flesh may send up high and pleasing Vapors, which may stir the Imagination, and Witches felicity is chiefly in imagination, as hath been said.

Here is an ancient received Tradition of the Salamander, that it liveth in the Fire, and hath force also to extinguish the fire. It must have two things, if it be true, to this operation. The one, a very close skin, whereby flame, which in the midst is not so hot, cannot enter: For we see, that the Palm of the Hand be anointed thick with White of Eggs, and then &quavis be poured upon it, and enflamed, yet one may endure the flame a pretty while. The other is someextrem cold and quenching vertue, in the Body of that Creature which9hoketh the fire. We see that Milk quencheth Wildfire better than Water, because it enthrall better.

Time doth change Fruit (as Apples, Pears, Pomegranates, &c.) from four to more sweet; but contrariwise. Liquors (even those that are of the Juice of Fruit) from more sweet to more sour; as, Wines, Must, New Vincyce, &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 mannered by the groser parts, which the Spirits do but digest: But in Drinks the Spirits do reign, and finding less opposition of the parts, become themselves more strong, which causeth also more strength in the Liquor; such, as if the Spirits be of the hotter fort, the Liquor becometh apt to burn; but in time, it causeth likewise, when the higher Spirits are evaporated more founres.

That hath been observed by the Ancients, that Plates of Metal, and especially of Brasses, applied presently to a blow, will keep it down from swelling. The cause is Repercussion, without Humectation, or entrance of any Body: For the Plate hath only a virtual cold, which doth not leach into the hurt; whereas all Plaisters and Oynments do enter. Surely, the cause that blows and bruises induce swellings is, for that the Spirits rejoyning to succor the part that laboreth, draw also the humors with them: For we see, that it is not the repulse, and the return of the humor in the part stricken that causeth it; for that Gouts, and Toothaches cause swelling, where there is no Percussion at all.
T

The nature of the Orris Root, is almost singular, for there be few odoriferous Roots; and in those that are in any degree sweet, it is but the same sweetness with the Wood or Leaf: But the Orris is not sweet in the Leaf, neither is that lower anything so sweet as the Root. The Root seemeth to have a tender dainty heat, which when it cometh above ground to the Sun, and the Air, vaniseth: For it is a great Mollifter, and hath a smell like a Violet.

IT hath been observed by the Ancients, that a great Vessel full, drawn into Bottles, and then the Liquor put again into the Vessel, will not fill the Vessel again, so full as it was, but that it may take in more Liquors; and that this holdeth more in Wine, than in Water. The cause may be trivial, namely, by the expence of the Liquors, in regard some may flick to the sides of the Bottles: But there may be a cause more subtil, which is, that the Liquor in the Vessel, is not so much compressed, as in the Bottle; because in the Vessel, the Liquor meeteth with Liquor chiefly; but in the Bottles, a small quantity of Liquor meeteth with the sides of the Bottles, which compress it so, that it doth not open again.

Water being contiguous with Air, cooleth it, but moisteneth it not, except it Vapor. The cause is, for that Heat and Cold have a Virtual Transition, without Communication of substance, but moisture not; and to all madefaction there is required an inhumation: But where the Bodies are of such several Levity, and Gravity, as they mingle not, they can follow no inimbation. And therefore, Oyl likewise, lieth at the top of the Water, without commixture: And a drop of Water running swiftly over a Straw or smooth Body, wettest not.

S

Starlight Nights, yea, and bright Moonshine Nights, are colder than Cloudy Nights. The cause is, the dryness and Fineness of the Air, which thereby becometh more piercing and sharp; and therefore great Continents are colder than Islands. And as for the Moon, though it fell inclineth the Air to moisture, yet when it shineth bright, it argueth the Air is dry. Also, close Air is warmer than open Air, which (it may be) is, for that the true cause of cold, is an expiration from the Globe of the Earth, which in open places is stronger. And again, Air itself, 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 Owls, could not see in the Nights; but that Air hath a little Light, proportionable to the Vital Spirits of those Creatures.

The Eyes do move one and the same way; for when one Eye moveth to the Nostril, the other moveth from the Nostril. The cause is Motion of Content, which in the Spirits and Parts Spiritual, is strong. But yet use will induce the contrary; for some can liquirt when they will. And the common Tradition is, that if Children were set upon a Table, with a Candle behind them, both Eyes will move outwards, as affecting to see the Light, and so induce Squinting.

We see more exquisitely with one Eye shut, than with both open. The cause is, for that the Spirits Visual unite themselves more, and so become stronger.
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The Eyes, if the light 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 between two Fingers, laid a crofs, feemeth double.

Pore-blind Men, see best in the dimmer light; and likewise have their sight stronger near hand, than they that are not Pore-blind, and can read and write smaller Letters. The cause is, for that the Spirits Visual, in those that are Pore-blind, are thinner and rarer, than in others: and therefore the greater light disperseth them. For the same cause they need contracting; but being contracted, are more strong than the Visual Spirits of ordinary eyes are; as when we see thorough a Level, the sight is the stronger: And to is it, when you gather the Eye-lids somewhat close: And it is commonly seen in those that are Pore-blind, that they do much gather the eye-lids together. But old Men, when they would see to read, put the Paper somewhat a far off. The cause is, for that old Mens Spirits Visual, contrary to those of Pore-blind Men unite not, but when the object is at some good distance from their Eyes.

Men see better when their Eyes are over against the Sun or a Candle, if they put their Hand a little before their Eye. The Reason is, for that the Glaring of the Sun, or the Candle, doth weaken the Eye; whereas the Light circumfused is enough for the Perception. For we see, that an over-light maketh the Eyes dazle, insomuch as perpetual looking against the Sun, would cause Blindness. Again, if Men come out of a great light, into a dark room; and contrariwise, if they come out of a dark room into a light room, they seem to have a Mift before their Eyes, and see worse than they shall do after they have stay'd a little while, either in the light, or in the dark. The cause is, for that the Spirits Visual, are upon a sudden change disturbed, and put out of order; and till they be recollected, do not perform their Function well. For when they are much dilated by light, they cannot contract suddenly; and when they are much contracted by darkness, they cannot dilate suddenly. And excess of both these, (that is, of the Dilatation, and Contraction of the Spirits Visual) if it be long, destroyeth the Eye. For as long looking against the Sun, or Fire, hurteth the Eye by Dilatation, so curious painting in small Volumes, and reading of small Letters, do hurt the Eye by contraction.

It hath been observed, that in Anger the Eyes wax red; and in Blushing, not the Eyes, but the Ears, and the parts behind them. The cause is, for that in Anger, the Spirits ascend and wax eager; which is most easily seen in the Eyes, because they are tranluclide, though withal it maketh both the Checks, and the Gils red; but in Blushing, it is true, the Spirits ascend like-wise to succor, both the Eyes and the Face, which are the parts that labor: But when they are repulsed by the Eyes, for that the Eyes, in shame do put back the Spirits that ascend to them, as unwilling to look abroad: For no Man, in that passion, doth look strongly, but dejectedly; and that repulsion from the Eyes, divertieth the Spirits and heat more to the Ears, and the parts by them.

The objects of the Sight, may cause a great pleasure and delight in the Spirits, but no pain or great offence; except it be by Memory, as hath been said. The Glimpse and Beams of Diamonds that strike the Eye, Indian Feathers, that have glorious colours, the coming into a fair Garden, the coming into
into a fair Room richly furnished; a beautiful person, and the like, do delight and exhilarate the Spirits much. The reason, why it holdeth not in the offence is, for that the Sight is most spiritual of the Senses, whereby it hath no object gros enough to offend it. But the taste (chiefly) is, for that there be no active objects to offend the Eye. For Harmonical Sounds, and Discordant Sounds, are both Active and Positive; so are sweet smells, andlinks; so are bitter, and sweetes, in tastes; so are over-hot, and over-cold, in touch; but blackness, and darkness, are indeed but privatives; and therefore have little or no Activity. Somewhat they do contribute, but very little.

After the Sea, or otherwise, looketh blacker when it is moved; and whiter when it reflecteth. The cause is, for that by means of the Motion, the Beams of Light pass not straight, and therefore must be darkened; whereas when it reflecteth, the Beams do pass straight. Besides, Splendor hath a degree of whiteness, especially, if there be a little repercussion for a Looking-Glass with the Steel behind; looketh whiter than Glass simple. This Experiment defereth to be driven further, in trying by what means Motion may hinder Sight,

Shell-fish have been by some of the Ancients, compared and sorted with the Insects; but I see no reason why they should, for they have Male, and Female, as other Fish have; neither are they bred of Putrefaction, especially such as do move. Nevertheless it is certain, that Oysters, and Cockles, and Mussels, which move not, have not discriminative Sex. Quare, in what time, and how they are bred? If fecmeth, that Shells of Oysters are bred where none were before; and it is tried, that the great Horse-Musle, with the fine shell, that breedeth in Ponds, hath bred within thirty years: But then, which is strange, it hath been tried, that they do not onely gape and shut as the Oysters do, but remove from one place to another.

The Senses are alike strong, both on the right side, and on the left; but the Limbs on the right side are stronger. The cause may be, for that the Brain, which is the Instrument of Sense, is alike on both sides; but Motion, and abilities of moving, are somewhat holpen from the Liver, which lieth on the right side. It may be also, for that the Senses are put in exercise, indifferently on both sides from the time of our Birth; but the Limbs are used most on the right side, whereby custom helpeth: For we see, that some are left-handed, which are such as have used the left-hand most.

Fritilions make the parts more fleasy, and full: As we see both in Men, and in the Curving of Horses, &c. The cause is, for that they draw greater quantity of Spirits and Blood to the parts; and again, because they draw the Aliment more forcibly from within; and again, because they relax the Pores, and so make better passage for the Spirits, Blood, and Aliment: Lastily, because they dissipate, and digest any Inutile, or Excrementitious moisture; which lieth in the Flesh; all which help Assimilation. Fritilions also do, more fill and impregnate the Body, than Exercise. The cause is, for that in Fritilions, the inward parts are at rest; which in exercise are beaten (many times) too much: And for the same reason (as we have noted heretofore) Galliflages are fat and fleasy, because they fill the Limbs more, and the inward parts less.
All Globes are far off, appear flat. The cause is, for that distance, being a secondary object of light, is not otherwise discerned, than by more or less light; which disparity, when it cannot be discerned, all seemeth one: As it is (generally) in objects not distinctly discerned: for so Letters, if they be so far off, as they cannot be discerned, shew but as dusky Papers; and all Engravings and Embossings (a far off) appear plain.

The uttermost parts of Shadows, seem ever to tremble. The cause is, for that the little Moats which we see in the Sun, do ever stir, though there be no Wind; and therefore those moving, in the meeting of the Light and the Shadow, from the Light to the Shadow, and from the Shadow to the Light, do shew the Shadow to move, because the Medium moveth.

Shallow and Narrow Seas, break more than deep and large. The cause is, for that the Impulsion being the same in both; where there is a greater quantity of Water, and likewise space enough, there the Water rouleth, and moveth, both more slowly, and with a slower rise and fall: But where there is less Water, and less space, and the Water dasheth more against the bottom; there it moveth more swiftly, and more in Precipice: For in the breaking of the Waves, there is ever a Precipice.

It hath been observed by the Ancients, that Salt-water boiled, or boiled and cooled again, is more potable, than of itself 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 kind of Scum on the top, and partly goeth into a Sediment in the bottom; and so is rather a separation, than an evaporation. But it is too gross to rise into a vapor; and so is a bitter taste likewise: For simple distilled Waters of Wormwood, and the like, are not bitter.

It hath been let down before, that Pits upon the Seashores turn 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 Africa, after a time, the Water in such Pits will become brackish again. The cause is, for that after a time, the very Sands, thorough which the Salt-Water passeth, become Salt; and so the Strainer itself is tainted with Salt. The remedy therefore is to dig still new Pits, when the old wax brackish: as if you would change your Strainer.

It hath been observed by the Ancients, that Salt-water will dissolve Salt put into it, in less time, than Fresh Water will dissolve it. The cause may be, for that the Salt in the precedent Water, doth by similitude of Substances, draw the Salt new put in, unto it; whereby it diffuseth in the Liquor more speedily. This is a noble Experiment, if it be true; for if the wettest means of more quick and easy Infusions and it is likewise a good instance of Attraction by Similitude of Substances. Try it with Sugar put into Water, formerly jugled, and into other Water unfugled.

Put Sugar into Wine, part of it above, part under the Wine; and you shall finde (that which may seem strange) that the Sugar above the Wine, will soften and dissolve sooner than that within the Wine. The cause is, for that the
the Wine entrench that part of the Sugar which is under the Wine, by simple Infusion or Spreading; but that part above the Wine is likewise forced by Sucking: For all Spongy Bodies expel the Air, and draw in Liquor, if it be contiguous; as we see it also in Sponges, part part above the Water. It is worthy the inquiry, to see how you may make more accurate Intuisions; by help of Attraction.

Water in Wells is warmer in Winter than in Summer; and so Air in Caves. The cause is, for that in the higher parts, under the Earth, there is a degree of some heat (as appeareth in sulphureous Veins, &c.) which shuts close in (as in Winter) the more; but if it perpiple (as it doth in Summer) it is the less.

IT is reported, that amongst the Leucadians, in ancient time, upon a superstition, they did use to precipitate a Man from a high Cliff into the Sea, saying about him with Strings, at some distance, many great Bows; and fixing into his Body divers Feathers spreded, to break the fall. Certainly many Birds of good Wing (as Kites, and the like) would bear up a good weight as they fly; and spreding of Feathers thin and close, and in great breath, will likewise bear up a great weight, being even laid without tilting upon the sides. The further extension of this Experiment for Flying, may be thought upon.

Here is in some places (namely, in Cephalonica) a little Shrub, which they call Holy Oak, or Dwarf Oak. Upon the Leaves whereof there is a Tumor, like a Blister; which they gather, and rub out of it, a certain red Duff, that converteth (after a while) into Worms, which they kill with Wine, (as is reported) when they begin to quicken: With this Duff they Die Scarlet.

In Zant, it is very ordinary, to make Men impotent, to accompany with their Wives. The like is practised in Gascony, where it is called Novo Equitale. It is practised always upon the Wedding day. And in Zant, the Mothers themselves do it by way of prevention, because thereby they hinder other Charms, and can undo their own. It is a thing the Civil Law taketh knowledge of, and therefore is of no light regard.

It is a common Experiment, but the cause is mistaken. Take a Pot (or better a Glass, because therein you may see the Motion) and set a Candle lighted in the Bottom of a Basin of Water; and turn the Mouth of the Pot or Glass over the Candle, and it will make the Water rise. They ascribe it to the drawing of heat, which is not true: For it appeareth plainly to be but a Motion of Air, which they call Nederium, and it proceedeth thus; The Flame of the Candle as soon, as it is covered, being suffocated by the close Air, lesseth by little and little: During which time, there is some little ascents of Water, but not much; for the Flame occupying less and less room, as it lesseth, the Water succeedeth. But upon the instant of the Candles going out, there is a sudden rise of a great deal of Water; for that the Body of the Flame filleth no more place, and so the Air and Water succeed. It worketh the same effect, if instead of Water, you put Flower, or Sand, into the Basin: Which sheweth, that it is not the Flames drawing the Liquor, as Nourishment, as it is supposed; for all Bodies are alike.
Natural History;

Of the Power of the Celestial Bodies, and what more secter influences they have, besides the two manifest influences of Heat and Light, we shall speak, when we handle Experiments touching the Celestial Bodies: Mean while, we will give some Directions for more certain Trials of the Variations and Influences of the Moon, which is our nearest Neighbor.

The Influences of the Moon (most observed) are four: the drawing forth of Heat; the Inducing of Putrefaction; the increase of Moistructures; the exciting of the Motions of Spirits.

For the drawing forth of Heat, we have formerly preferred to take Water warm, and to set part of it against the Moon-beams, and part of it with a Skreen between; and to see whether that which standeth exposed to the Beams will not cool sooner. But because this is but a small interposition, (though in the Sun we see a small shade doth much) it were good to try it when the Moon shineth, and when the Moon shineth not at all; and with Water warm in a Glass-bottle as well as in a Difh, and with Cinders, and with Iron red-hot, &c.

For the inducing of Putrefaction, it were good to try it with Flesh or Fish exposed to the Moon-beams, and again exposed to the Air when the Moon shineth nor, for the like time, to see whether will corrupt sooner and try it also with Capon, or some other fowl laid abroad, to see whether it will mortifie and become tender sooner. Try it also with dead Flies or dead Worms, having a little Water cast upon them, to see whether will putrefy sooner. Try it also with an Apple or Oranges, having holes made in their tops, to see whether will rot or mould sooner. Try it also with Holland Cheese, having Wine put into it, whether it will breed Mites sooner or greater.

For the increase of Moistructure, the opinion received is, that Seeds will grow fooner, and Hair, and Nails, and Hedges, and Herbs, cut, &c. will grow sooner, if they be set or cut in the increase of the Moon: Also, that Brains in Rabits, Wood-cocks, Calves, &c. are fullest in the Full of the Moon; and so of Marrow in the Bones, and so of Oysters and Cockles; which of all the rest are the easiest tried, if you have them in Pots.

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 near as may be, and therefore best in Pots: Let the Pots also stand where no Rain or Sun may come to them, left the difference of the Weather confound the Experiment. And then see in what time the Seeds set, in the increase of the Moon, come to a certain height, and how they differ from those that are set in the decrease of the Moon.
It is like, that the Brain of Man waxeth moister and fuller upon the Full of the Moon; and therefore it was good for those that have moist Brains, and are great Drinkers, to take fume of Lignum vitae, Rosemary, Frankincense, &c. about the Full of the Moon. It is like also, that the Humors in Mens Bodies increase and decrease, as the Moon doth; and therefore it was good to purge some day or two after the Full, for that then the Humors will not replenish so soon again.

As for the exciting of the motion of the Spirits, you must note, that the growth of Hedges, Herbs, Hair, &c. is caused from the Moon, by exciting of the Spirits; as well as by increase of the moisture. But for Spirits in particular, the great instance is in Lunesies.

There may be other secret effects of the influence of the Moon, which are not yet brought into observation. It may be, that if it do fall out, that the Wind be North or North-East, in the Full of the Moon, it increaseth Cold; and if South or South-West, it disposeth the Air for a good while to warmth and rain; which would be observed.

It may be that Children and young Cartel that are brought forth in the Full of the Moon, are stronger and larger then those that are brought forth in the Wanes; and those also which are begotten in the Full of the Moon; So that it might be good Husbandry, to put Rams and Bulls to their Females somewhat before the Full of the Moon. It may be also, that the Eggs laid in the Full of the Moon, breed better Birds; and a number of the like effects, which may be brought into observation. Quere also, whether great Thunders and Earth-quakes be not most in the Full of the Moon.

The turning of Wine to Vinegar, is a kind of Putrefaction; and in making of Vinegar, they use to set Vessels of Wine over against the Noon Sun, which calleth out the more Oily Spirits, and leaveth the Liquor more sour and hard. We see also, that Burnt-Wine is more hard and astrin¬gent then Wine unburnt. It is said, that Cider in Navigations under the Line ripeneth, when Wine or Beer fourteenth. It were good to set a Rundlet of Vei¬nace over against the Sun in Summer; as they do Vinegar, to see whether it will ripen and sweeten.

Here be divers Creatures that sleep all Winter; as the Bear, the Hede¬hog, the Bat, the Bee, &c. These all wax fat when they sleep, and eggit not. The cause of their fattening, during their sleeping time, may be the want of assimilating; for whatsoever assimilates not to Fiefl, turneth either to sleep or fat. These Creatures, for part of their sleeping time, have been observed not to stir at all; and for the other part, to stir, but not to remove, and they get warm and close places to sleep in. When the Flemings wintried in Norway, the Bears about the middle of November went to sleep; and then the Foxes began to come forth, which durst not before. It is noted by some of the Ancients, that the She Bear-breeth, and lieth in with her young during that time of Rest; and that a Bear big with young, hath seldom been seen.

Some Living Creatures are procreated by Copulation between Male and Female, some by Putrefaction; and of those which come by Putrefaction, many do (nevertheless) afterwards procreate by Copulation. For the cause of both Generations: First, it is most certain, that the cause of all Vivi¬
fication is a gentle and proportionable heat, working upon a glutinous and yielding sublunation; for the heat doth bring forth Spirit in that sublunation, and the sublunation being glutinous, produceth two effects; the one, That the Spirit is detained, and cannot break forth; the other. That the matter being gentle and yielding, is driven forwards by the motion of the Spirits, after some swelling into shape and members. Therefore all Sperm, all Menstrueus sublunation, all matter whereof Creatures are produced by Putrefaction, have evermore a Closefnes, Lentor, and Sequacity. It seemeth therefore that the Generation by Sperm only, and by Putrefaction, have two different causes. The first is, for that Creatures which have a definite and exact shape (as those have which are procreated by Copulation) cannot be produced by a weak and casual heat; nor out of matter, which is not exactly prepared according to the Species. The second is, for that there is a greater time required for Maturation of perfect Creatures; for if the time required in Vivification be of any length, then the Spirit will exhale before the Creature be mature; except it be inclosed in a place where it may have continuance of the heat, access of some nourishment to maintain it, and closenes that may keep it from exhaling; and such places, or the Wombs and Matrices of the Females: And therefore all Creatures made of Putrefaction, are of more uncertain shape, and are made in shorter time, and need not so perfect an enclosure, though some closenes be commonly required. As for the Heathen opinion, which was, That upon great mutations of the World, perfect Creatures were first ingendred of Concretion, as well as Frogs, and Worms, and Flies, and such like, are now; we know it to be vain: But if any such thing should be admitted, discoursing according to sense, it cannot be, except you admit of a Chaos first, and commixture of Heaven and Earth; for the Frame of the World once in order, cannot effect it by any excess or casualty.
The Philosophy of Pythagoras (which was full of Superstition) did first plant a Monstrous Imagination, which afterwards was, by the School of Plato, and others, watered and nourished. It was, That the World was one entire perfect Living 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 again. They went on, and inferred, That if the World were a Living Creature, it had a Soul and Spirit; which also they held, calling it Spiritus Mundi, the Spirit or Soul of the World; by which, they did not intend God, (for they did admit of a Deity besides) but only the Soul, or intellectual Form of the Universe. This Foundation being laid, they might build upon it what they would; for in a Living Creature, though never so great (as for example, in a great Whale) the Sense and the Affects of any one part of the Body instantly make a Transfusio throughout the whole Body. So that by this they did insinuate, that no distance of place, nor want or indisposition of Matter, could hinder Magical Operations; but that (for example) we might here in Europe have Sense and Feeling of that which was done in China; and likewise, we might work any effect without and against Matter: And this not holden by the co-operation of Angels or Spirits but only by the Unity and Harmony of Nature. There were some also that said not this, but went further, and held, That if the Spirit of Man (whom they call the Microcosm) do give a fit touch to the Spirit of the World, by strong Imaginations and Beliefs, it might command Nature; for Paracelsus, and some darksome Authors of Magick, do ascribe to Imagination exalted the Power of Miracle-working Faith. With these vain and bottomless Follies Men have been (in part) entertained.
Men are to be admonished, that they do not withdraw credit from the Operations by Transmition of Spirits and Force of Imagination, becaueth the effects fail sometimes. For as in Infection and Contagion from Body to Body, (as the Plague, and the like) it is most certain, that the Infection is received (many times) by the Body Passive, but yet is by the strength and good disposition thereof repelled, and wrought out, before it be formed into a Disease: so much more in Impressions from Minde to Mind: or from Spirit to Spirit, the Impression taketh, but is encountered and overcome by the Minde and Spirit, which is Passive, before it work any manifest effect: And therefore they work most upon weak Mindes and Spirits; as those of Women, Sick Persons, Superstitious and fearful Persons, Children, and young Creatures.

Nefco quin veneros acutu mibi fasicae Agnos:
The Poet speaketh not of Sheep, but of Lambs. As for the weaknesses of the Power of them upon Kings and Magistrates, it may be ascribed (besides the main, which is the Protection of God over those that execute his place) to the weaknesses of the Imagination of the Imaginat; for it is hard for a Witch or a Sorcerer to put on a belief, that they can hurt such persons.

Men are to be admonished on the other side, that they do not easily give place and credit to these operations, because they succeed many times: For the cause of this success is (oft) to be truly ascribed unto the force of Affection and Imagination upon the Body Agent, and then by a secondary means it may work upon a diverse Body. As for example, If a man carry a Planet's Seal or a Ring, or some part of a Beast, believing strongly that it will help him to obtain his Love, or to keep him from danger of hurt in Fight, or to prevail in a Suit, &c. it may make him more active and industrious; and again, more confident and persisting, then otherwise he would be. Now the great effects that may come of Industry and Perseverance (especially in civil busines) who knoweth not? For we see audacity doth almost bind and make the weaker fort of Minde; and the state of Humane Adicions is so variable, that to try things oft, and never to give over, doth wonders: Therefore it were a meer fallacy and miltaking to ascribe that to the Force of Imagination upon another Body, which is but the Force of Imagination upon the proper Body; for there is no doubt but that Imagination and vehement Affection work greatly upon the Body of the Imaginat, as we shall shew in due place.

Men are to be admonished, that as they are not to mistake the causes of these Operations, so much less they are to mistake the Factic or Effect, and rashly to think that for done which is not done. And therefore, as divers wise Judges have prescribed and cautioned, Men may not too rashly believe...
believe the Confession of Witches, nor yet the evidence against them: For
the Witches themselves are Imaginative, and believe oftentimes they do that
which they do not; and people are credulous in that point: and ready to
impure Accidents and Natural operations to Witchcraft. It is worthy the
observing, that both in ancient and late times, (as in the Hexatalian Witches,
and the meetings of Witches that have been recorded by so many late Con-
fessions) the great wonders which they tell of carrying in the Air, trans-
forming themselves into other Bodies, &c. are still reported to be wrought,
not by Incantation or Ceremonies, but by Ointments and Anointing them-
selves all over. This may justly move a Man to think, that these Fables are
the effects of Imagination; for it is certain, that Ointments do all (if they be
laid on anything thick) by stopping of the Pores, that in the Vapors, and
send them to the head extramly. And for the particular Ingredients of
these Magical Ointments, it is like they are opiate and soporiferous. For
Anointing of the Forehead, Neck, Feet, Back-bone, we know is used for
procuring dead sleeps. And if any Man say, that this effect would be bet-
ter done by inward potions; answer may be made, that the Medicines which
go to the Ointments are so strong, that if they were used inwards, they
would kill those that use them; and therefore they work potently, though out-
wards.

We will divide the several kindes of the operations by transmilion of
Spirits and Imagination, which will give no small light to the Experiments
that follow. All operations by transmilion of Spirits and Imagination have
this, that they work at distance, and not at touch; and they are these being
distinguifh'd.

The first is, The Transmilion or Emission of the thinner and more
airy parts of Bodies, as in Odors and Infections; and this is, of all the
telt, the most corporeal. But you must remember withal, that there
be a number of those Emissions, both wholome and wholeofme, that
give no smell at all: For the Plague many times when it is taken giveth
no-fent at all, and there be many good and healthful Airs, as they appear
by Hilitation, and other proofs, that differ not in Smell from other Airs.
And under this head you may place all Imbibitions of Air, where the sub-
stance is material, odor-like, whereof some nevertheless are strange, and
very sudenly diffus'd; as the alteration which the Air receiveth in Egypt,al-
mot immediately upon the rising of the River of Nilus, whereof we have
spoken.

The second is, the Transmilion or Emission of those things that we call
Spiritual Species, as Visibles and Sounds; the one whereof we have hand-
lad, and the other we fhall handle in due place. These move swiftly and at
great distance, but then they require a Medium well disposed, and their Trans-
milion is easily stopped.

The third is, the Emissions which cause Attraction of certain Bodies at
distance; wherein though the Loadstone be commonly placed in the first
rank, yet we think good to except it, and refer it to another Head: But
the drawing of Amber, and Jet, and other Eleftrick Bodies, and the At-
traction in Gold of the Spirit of Quick-flyer at distance, and the Attraction
of Heat at distance, and that of fire to Raphis, and that of some Herbs
to Water, though at distance, and divers others, we shall handle; but
yet not under this present title, but under the title of Attraction in
general.
The fourth is, the Emission of Spirits, and Immateriace Powers and Virtues, in those things which work by the universal configuration and Sympathy of the World; not by Forms, or Celestial Influences, (as is vainly taught and received) but by the Primitive Nature of Matter, and the seeds of things. Of this kinde is (as we yet suppose) the working of the Loadstone, which is by content with the Globe of the Earth; of this kinde is the motion of Gravity, which is by content 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 conceive the Main Float and Refloat of the Sea is, which is by content of the Universe, as part of the Diurnal Motion. These Immateriace Virtues have this property differing from others, that the diversity of the Medium hindreth them not, but they pass through all Mediums, yet as determinate distances. And of these we shall speak, as they are incident to several Titles.

The fifth is, the Emission of Spirits; and this is the principal in our intention to handle now in this place, namely, the operation of the Spirits of the minde of Man upon other Spirits; and this is of a double nature; the operation of the Affections, if they be vehement; and the operation of the Imagination, if it be strong. But these two are so coupled, as we shall handle them together; for when an envious or amorous aspect doth infect the Spirits of another, there is joined both Affection and Imagination.

The sixth is, the influxes of the Heavenly Bodies, besides those two manifest ones of Heat and Light. But these we will handle, where we handle the Celestial Bodies and Motions.

The seventh is, the operations of Sympathy, which the Writers of Natural Magick have brought into an Art or Precepts; and it is this, That if you desire to super-induce any Virtue or Disposition upon a Person, you should take the Living Creature, in which that Virtue is most eminent and in perfection; of that Creature you must take the parts wherein that Virtue chiefly is collocate. Again, you must take the parts in the time, and act when that Virtue is most in exerce, and then you must apply it to that part of Man, wherein that Virtue chiefly consilits. As if you would super-induce Courage and Fortitude, take a Lion, or a Cock; and take the Heart, Tongue, or Paw of the Lion, or the Heart, or Spur of the Cock: Take those parts immediately after the Lion or the Cock have been in fight, and let them be worn upon a Mans heart or wryst. Of these and such like Sympathies we shall speak under this present Title.

The eighth and last is, an Emission of Immateriace Virtues, such as we are a little doubtful to propound it is so prodigious, but that it is so constantly avouched by many: And we have let it down as a Law to ourselves, to examine things to the bottom; and not to receive upon credit, or reject upon improbabilities, until there hath passed a Due Examination. This is the Sympathy of Individuals; for as there is a Sympathy of Species, so (it may be) there is a Sympathy of Individuals; that is, that in things, or the parts of things that have been once contiguous or entire, there should remain a transmigration of Virtue from the one to the other, as between the Weapon and the Wound. Whereupon is blazed abroad the operation of Vagniumon Teles, and so of a piece of Lard, or Chirt of Eider, &c. That if part of it be consumed or purified, it will work upon the other parts severally. Now we will pursue the instances themselves.
The Plague is many times taken without manifest sense, as hath been said; and they report, that where it is found it hath a sent of the smell of a Mellow Apple, and (as some say) of May-flowers: And it is also received, that smells of Flowers that are Mellow and Lushious, are ill for the Plague; as White Lilies, Cowslips, and Hyacinths.

The Plague is not easily received by such as continually are about them that have the Plague, as Keepers of the Sick, and Physicians; nor again by such as take Antidotes, either inward (as Muriatates, Juniper-berries, Rye, Loaf, and Seed, &c.) or outward (as Angelica, Zedoary, and the like in the Mouth; Tar, Galbanum, and the like in Perfume:) Nor again, 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 Air, and of those that are falling, and of Children; and it is likewise noted to go in a Blood more then to a Stranger.

The most pernicious Infection, next the Plague, is the smell of the Goal, when Prisoners have been long, and close, and saltily kept; whereas we have had in our time, experience twice or thrice, when both the Judges that sat upon the Goal, and numbers of those that attended the business, or were present, sickened upon it, and died. Therefore it were good wisdom, that in such cases the Goal were aired before they be brought thence.

Out of question, if such foul smells be made by Art, and by the Hand, they confit chiefly of Mans flesh, or sweat, putrefied; for they are not those things which the Notitia straight abhor and expel, that are most pernicious, but such Airs as have some similitude with Mans body, and so insinuate themselves, and betray the Spirits. There may be great danger in using such Compositions in great Meetings of People within Houses; as in Churches, at Assembly, at Plays and Solemnities, and the like: For poysoning of Air is no less dangerous, than poysoning of Water, which hath been used by the Turks in the Wars, and was used by Emanuel Comenius towards the Christians, when they passed through his Countrey to the Holy Land. And these empoisonments of Air are the more dangerous in Meetings of People, because the much breath of People doth further the reception of the Infection. And therefore when any such thing is feared, it were good those publick places were perfumed before the Assemblies.

The empoisonment of particular persons by Odors, hath been reported to be in perfumed Gloves, or the like. And it is like they mingle the poyson that is deadly with some smells that are sweeter, which also maketh it the sooner received. Plagues also have been railed by Anointings of the Chinks of Doors, and the like; not so much by the touch, as for that it is common for men, when they finde any thing wet upon their fingers, to put them to their Nose; which men therefore should take heed how they do. The best is, that these Compositions of Infectious Airs cannot be made without dangers of death to them that make them; but then again, they may have some Antidotes to save themselves; so that men ought not to be secure of it.

There have been in divers Countrieys great Plagues by the putrefaction of great swarms of Grasshoppers and Locusts, when they have been dead and call upon heaps.

It happeneth oft in Mines, that there are Damps which kill either by Suffocation, or by the poysonous nature of the Mineral; and those that deal
deal much in Refining, or other works about Metals and Minerals, have their Brains hurt and stupefied by the Metalline Vapours. Amongst which, it is noted, that the Spirits of Quick-silver ever fly to the Skull, Teeth, or Bones; insomuch, as Gilders use to have a piece of Gold in their Mouth to draw the Spirits of Quick-silver; which Gold afterwards they finde to be whitned. There are also certain Lakes and Pits, such as that of Avernum, that poylon Birds (as is said) which flye over them, or Men that stay too long about them.

919. The Vapor of Char-coal or Sea-coal in a close room; hath killed many; and it is the more dangerous, because it cometh without any ill smell, but stealthly on by little and little, inducing only faintness, without any manifest strangling. When the Dutchmen winbled at Nova-Zembla, and that they could gather no more sticks, they fell to make fire of some Sea-coal they had, wherewith (at first) they were much refreshed; but a little after they had sat about the fire, there grew a general silence and lothness to speak amongst them; and immediately after, one of the weakest of the Company fell down in a swoon: Whereupon, they doubting what it was, opened their door to let in Air, and so saved themselves. The effect (no doubt) is wrought by the impification of the Air, and of the Breath and Spirits. The like enioth in Rooms newly Piaifred, if a fire be made in them; whereof no lefs Min then the Emperor Jovinium died.

920. Vide the Experiment 803. Touching the Infectious Nature of the Air upon the firft Showers after long Drought.

921. It hath come to pafl, that some Apothecaries, upon ftrainmg of Coloquinida, have been put into a great Straining by the Vapour onely.

922. It hath been a practice to burn a Pepper they call Gahne-Pepper, which hath fuch a strong Spirit, that it provoketh a continual Sneezing in those that are in the Room.

923. It is an Ancient Tradition, that Bear Eyes infect Sound Eyes; and that a Meftruous Woman looking in a Glass doth rulh it: Nay, they have an opinion, which feemeth fabulous. That Meftruous Women going over a Field or Garden, do Cure and Heare good by killing the Worms.

924. The Tradition is no lefs ancient, that the Basilisk killeth by aspects; and that the Woufs, if he feeth a Man firit, by aspect triceth a Man hoarie.

925. Perfumes convenient do dry and strengthen the Brain, and stay Rheums and Defluxions; as we finde in Fume of Rosemary dried, and Lignum Aloes, and Calamus taken at the Mouth and Nostrils. And no doubt, there be other Perfumes that do moisten and refresh, and are fit to be used in Burning Agues, Consumptions, and too much wakefulnes; such as are Rose-water, Vinegar, Lemon-pills, Violets, the Leaves of Vines sprinkled with a little Rose-water, &c.

926. They do use in sudden Faintings and Swoonings, to put a Handkerchief with Rose-water, or a little Vinegar to the Nose, which gathereth together again the Spirits, which are upon point to resolve and fall away.

927. Tobacco comforteth the Spirits, and dischargeth wearines; which it worketh, partly by opening, but chiefly by the opiate virtue, which condenith the Spirits. It was good therefore to try the taking of Fumes by Pipes (as they do in Tobacco) of other things, as well to dry and comfort, as for other intentions. I with tryal be made of the drying Fume of Rosemary and Lignum Aloes, before mentioned in Pipe, and f0 of Nymphae and Foliun Indum, &c.

The
The following of the Plough hath been approved for refreshing the Spirits, and procuring Appetite; but to do 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 do it when you follow Barley. But because Ploughing is tied to Sealons, it is best to take the Air of the Earth new turned up by digging with the Spade, or standing by him that diggeth. Gentlewomen may do themselves much good by kneeling upon a Cushion, and Weeding. And these things you may practice in the best Sealons; which is ever the early Spring, before the Earth putteth forth the Vegetables, and in the sweetest Earth you can chuse. It would be done also when the Dew is a little off the Ground, left the Vapor be too moist. I knew a great Man that lived long, who had a clean Clod of Earth brought to him every morning as he lay in his Bed; and he would hold his head over it a good pretty while. I commend also sometimes in digging of fresh Earth, to pour in some Malmsey or Greek Wine, that the Vapor of the Earth and Wine together may comfort the Spirits the more; provided always it be not taken for a Heathen Sacrifice or Libation to the Earth.

They have in Physick use of Pomanders, and knots of Powders for drying of Rheums, comforting of the Heart, provoking of Sleep, &c. for though those things be not so strong as Perfumes, yet you may have them continually in your hand, whereas Perfumes you can take but at times; and besides, there be divers things that breath better of themselves then when they come to the Fire; as Nigella Romana, the Seed of Melanchthon, Ammon, &c.

There are two things which (inwardly used) do cool and condence the Spirits; and I wish the same to be tried outwardly in Vapors. The one is Nitre, which I would have dissolved in Malmsey, or Greek Wine, and so the smell of the Wine taken; or, if you would have it more forcible, pour of it upon a Fire-pan well heated, as they do Rose-water and Vinegar. The other is, the distilled Water of Wilde Poppy; which I wish to be mingled at half with Rose-water, and so taken with some mixture of a few Cloves in a Perfuming-pan. The like would be done with the distilled Water of Saffron-flowers.

Smells of Musk, and Amber, and Civet, are thought to further Venereous Appetite; which they may do by the refreshing and calling forth of the Spirits.

Incense and Nicerous smells (such as were of Sacrifices) were thought to intoxicate the Brain, and to dispose men to devotion; which they may do by a kind of madness and contrition of the Spirits, and partly also by Heating and Exalting them. We see that amongst the Jews, the principal perfume of the Sanctuary was forbidden all common use.

There be some Perfumes preferred by the Writers of Natural Magick, which procure plesant Dreams; and some others (as they say) that procure Prophetical Dreams, as the Seeds of Flax, Fleawort, &c.

It is certain, that Odors do in a small degree, nourish, especially the Odor of Wine; and we see Men an hunred do love to smell hot Bread. It is related, that Democritus when he lay a dying, heard a Woman in the House complain, that she should be kept from being at a Feast and Solemnity (which he much desired to see) because there would be a Corps in the House: Whereupon he caused Leaves of new Bread to be sent for, and opened them, and poured a little Wine into them, and so kept himself alive with the
the Odor of them till the Feast was past. I knew a Gentleman that would
sift (sometimes) three or four, yea, five days, without Meat, Bread, or
Drink; but the same Man used to have continually a great Wig of Herbs
that he smelled on, and amongst those Herbs some of aercient Herbs of strong
lent, as Onion, Garlic, Leeks, and the like.

They do use for the Accident of the Mother to burn Feathers, and other
things of ill Odor; and by those ill smells the rising of the Mother is put
down.

There be Airs which the Physicians advise their Patients to remove
unto in Consumptions, or upon recovery of long ticknethes, which (commonly)
are plain Champaigns, but Grazing, and not over-grown with Heath,
or the like; or else Timber-shades, as in Forests, and the like. It is noted also,
that Groves of Bays do forbid Pefilient Airs; which was accounted a
great cause of the wholesome Air of Anitochia. There be also some Soys
that put forth Odorate Herbs of themselves, as Wild Thyme, Wild Marjoram,
Penny-royal, Camomile; and in which, the Bay or Rose smells almost like Musk.
(foe) which (no doubt) are signs that do discover an excellent Air.

It were good for men to think of having healthful Air in their Houfes;
which will never be, if the Rooms be low-roofed, or full of Windows and
Doors; for the one maketh the Air close, and not fresh; and the other,
maketh it exceeding unequal, which is a great enemy to health. The Win-
dows also should not be high up to the Roof (which is in use for Beauty and
Magnificence) but low. Allo Stone-walls are not wholesome; but Timber is
more wholesome, and especially Brick; ay, it hath been used by some
with great success, to make their Walls thick, and to put a Lay of Chalk
between the Bricks to take away all dampness.

These Emifions (as we said before) are handled, and ought to be hand-
led by themfelves, under their proper Titles; that is, Visible, and
Audible, each apart: In this place, it shall suffice to give some general Ob-
servations common to both. First, they seem to be Incorporeal. Secondly,
they work swiftly. Thirdly, they work at large distances. Fourthly, in
curious varieties. Fifthly, they are not effective of anything, nor leave any
work behind them; nor are energies merely; for their working upon mir-
rors and places of Echo doth not alter any thing in those Bodies; but it is
the fame Action with the Original, only repurculled. And as for the shaking
of Windows, or rarifying the Air by great noifes, and the Heat caused by
Burning. Glaffes, they are rather Concomitants of the Audible and Visible
Species, then the effects of them. Sixthly, they seem to be of fo tender and
weak a Nature, as they affect only such a Rare and Attenuate Subftance
as is the Spirit of Living Creatures.

It is mentioned in some Stories, that where Children have been exposed
or taken away young from their Parents, and that afterward they have
approached to their Parents preference, the Parents (though they have not
Known them) have had a secret Joy, or other Alteration thereupon.

There was an Egyptian Soothsayer that made Anniun believe, that his
genius (which otherwise was brave and confident) was, in the presence of
Othamus Caftar, poor and cowardly; and therefore, he advised him to absent
himself (as much as he could) and remove far from him. The Soothsayer
was thought to be suborned by Cleopatra, to make him live in Egypt, and other
remote
remote places from Rome. Howsoever, the conceit of a predominant or
mattering Spirit of one Man over another is ancient, and received still, even
in vulgar opinion.

There are conceits, that some Men that are of an ill and melancholy
nature, do incline the company into which they come, to be sad and ill dis-
pose, and contrariwise, that others that are of a jovial nature do dispa-
the company to be merry and cheerful: And again, that some Men are lucky
to be kept company with, and employed, and others unlucky. Certainly it
is agreeable to reason, that there are at the least some light effusions from
Spirit to Spirit when Men are in presence one with another, as well as from
Body to Body.

It hath been observed, that old Men have loved young company, and
been conversant continually with them, have been of long life; their Spirits
(as it seemeth) being recreated by such company. Such were the Ancient
Sophists and Rhetoricians, which ever had young Auditors and Disciples;
as *Gorgias, Protagoras, Socrates,* &c. who lived till they were an hundred years
old; and so likewise did many of the *Grammarians and Schoolmasters:* Such as
was *Orbilius,* &c.

Audacity and confidence doth, in civil businesse, so great effect, as a
Man may (reasonably) doubt, that besides the very daring, and earnestness,
and persisting, and importunity, there should be some secret binding and
floooping of other Men's Spirits to such persons.

The Affections (no doubt) do make the Spirits more powerful and active,
and especially those Affections which draw the Spirits into the Eyes; which
are two, Love and Envy, which is called *Oculus Mates.* As for Love, the
Platonists (some of them) go so far, as to hold, That the Spirit of the Lover
doth pass into the Spirit of the person loved, which causeth the desire of
return into the Body whence it was emitted, whereupon followeth that ap-
petite of contract and conjunction which is in Lovers. And this is observed
likewise, that the Apsects that procure Love, are not gazings, but sudden
glances and dartings of the Eye. As for Envy, that emiteth some malign
and poisonous Spirits, which take hold of the Spirit of another; and is like-
wise of greatest force, when the Call of the Eye is oblique. It hath been no
sed also, That it is most dangerous, where the envious Eye is cast upon per-
fons in glory, and triumph, and joy. The reason whereof is, for that at such
times the Spirits come forth most into the outward parts, and so meet the
perception of the envious eye more at hand; and therefore it hath been no-
ted, That after great triumphs, Men have been ill disposed for some days
following. We see the opinion of Fascination is ancient for both effects, of
procuring Love, and sickness caused by Envy; and Fascination is ever by
the Eye. But yet if there be any such infection from Spirit to Spirit, there
is no doubt, but that it worketh by presence, and not by the Eye alone, yet
most forcibly by the Eye.

Fear and Shame are likewise infective: For we see that the starting of one,
will make another ready to start, and when one man is out of countenance
in a company, others do likewise blush in his behalf.

Now we will speak of the *Force of Imagination* upon other Bodies, and
of the means to exalt and strengthen it. Imagination, in this place, I un-
derstand to be the representation of an Individual Thought. Imagination is
of three kinds; the first, joyned with *Belief* of that which is to come; the sec-
ond, joyned with *Memory* of that which is past; and the third, of *Things
present,* or as if they were present: For I comprehend in this, Imagination
reigned,
Natural History;

Heigned, and at pleasure: As if one should imagine such a Man to be in the Vellments of a Pope, or to have Wings. I single out for this time that which is with Faith or Belief of that which is to come. The Inquisition of this Subject in our way (which is by Induction) is wonderful 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 we will after declare.

The Power of Imagination is in three kinds. The first, upon the Body of the imaginant, including likewise the Child in the Mothers Womb. The second is, the power of it upon dead bodies, as Plants, Wood, Stone, Metal, &c. The third is, the power of it upon the Spirits of Men and Living Creatures. And with this last we will only meddle.

The Problem therefore is, Whether a Man constantly and strongly believing that such a thing shall be, (as that such an one will love him, or that such an one will grant him his request, or that such an one shall recover a sickness, or the like) it doth help any thing to the effecting of the thing it se f. And here again we must warye differing; for it is not meant (as hath been partly said before) that it should help by making a man more furious, or more indifferent; (in which kind, constant belief doth much) but merely 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 experiments for I cannot command my self to believe what I will, and so no tryal can be made. Nay it is worse; for whatsoever a Man imagineth doubtingly, or with fear, must needs do hurt, if Imagination have any power at all; for a Man reprehenseth that officer that he feareth, then the contrary.

The help therefore is, for a Man to work by another, in whom he may create belief, and not by himself, until himself have found by experience, that Imagination doth prevail; for then experience worketh in himself Belief, if the Belief that such a thing shall be joined with a Belief, that his Imagination may procure it.

For example, I related one time to a Man that was curious and vain enough in these things, That I saw a kind of juggler that had a Pair of Cards, and would tell a man what Card he thought. This pretended Learned Man told me, it was a mistaking in me. For (said he) it was not the knowledge of the Man thought (for that is proper to God) but it was the enforcing of a thought upon him, and binding his Imagination by its stronger, that he could think no other Card. And thereupon he asked me a Question or two, which I thought he did but cunningly, knowing before what used to be the fears of the juggler. Sir, (said he) do you remember whether he told the Card the Man thought himself, or bad another to tell it? I answered, (as was true) That he bad another tell it. Whereunto he said, So I thought: For, (said he) himself could not have put on so strong an Imagination, but by telling the other the Card (who believed, that the juggler was some strange man, and could do strange things) that other man caught a strong imagination. I hearkened unto him, thinking for a vanity he spake prettily. Then he asked me another Question: Sahith he, Do you remember whether he told the Card the Man thought himself, or had another to tell it? I told him, (as was true) That he did first whisper the Man in his Ear what he should think: or else, that he did whisper the Card in the Mans Ear that should tell the Card, telling, That such a Man should think such a Card, and after had the Man think a Card? I told him, (as was true) That he did first whisper the Man in the Ear, that such a Man should think such a Card. Upon this, the Learned Man did much exult and please himself, saying, Lo, you may see that my opinion is right: For if the Man had thought first, his thoughts had been fixed; but the other imagining first, bound his thoughts. Which though it did somewhat sink with me, yet I made
made it lighter then I thought, and said, I thought it was confederacy between the
Jugler, and the two Servants; though (indeed) I had no reason so to think, for
they were both my Fathers Servants, and he had never plaid in the House
before. The Jugler also did cause a Garter to be held up, and took upon
him to know that such an one should point in such a place of the Garter, as
it should be near so many inches to the longer end, and so many to the shorter;
and still he did it by first telling the imaginier, and after bidding the actor
think.

Having told this Relation, not for the weight thereof, but because it
doeth handsomely open the nature of the Question, I return to that I said,
That Experiments of Imagination must be practised by others, and not by a Mans
self. For there be three means to forthis Belief: the first is Experience, the
second is Reason, and the third is Authority. And that of these which is
far the most potent, is Authority: For Belief upon Reason or Experience
will stagger.

For Authority, it is of two kindes : Belief in an Art, and Belief in a
Man. And for things of Belief in an Art, a Man may exercise them by himself;
but for Belief in a Man, it must be by another. Therefore if a Man be
vbelieve in Astrology, and finde a figure prosperous; or believe in Natural Magick,
and that a Ring with such a Stone, or such a piece of a Living Creature
carried, will do good, it may help his Imagination; but the Belief in a Man
is far the more active. But howsoever all Authority must be out of a Mans
self, turned (as was said) either upon an Art, or upon a Man; and where
Authority is from one Man to another, there the second must be Ignorant,
and not learned, or full of thoughts: And such are (for the most part) all
Witches and superstitious persons, whose beliefs, tied to their Teachers and
Traditions, are no whit controlled either by Reason or Experience: And
upon the same reason, in Magick they use (for the most part) Boys and young
People; whose spirits easily take Belief and Imagination.

Now to fortifie Imagination, there be three ways: The Authority
whence the Belief is derived; Means to quicken and corroborate the Imagination;
and Means to repeat it and refresh it.

For the Authority we have already spoken. As for the second, namely,
the Means to quicken and corroborate the Imagination, we see what hath been
used in Magick, (if there be in those practices anything that is purely Natural) as Vellments, Characters, Words, Seals, some parts of Plants, or Living
Creatures, Stones, choice of the Hour, Gestures and Motions; also Incen
des and Odors; choice of Society, which increaseth Imagination, Diets and
Preparations for some time before. And for Words, there have been ever used,
either barbarous words of no sense, left they should disturb the
Imagination; or words of similitude, that may second and feed the Imagination:
And this was ever as well in Heathen Charms, as in Charms of later
times. There are used also Scripture words, for that the Belief that Religious
Texts and Words have power, may strengthen the Imagination: And for the
same reason He brewe words (which amongst us is counted the holy Tongue,
and the words more mystical) are often used.

For the refreshing of the Imagination (which was the third Means of
Exciting it) we see the practices of Magick; as in Images of Wax, and the
like, that should melt by little and little, or some other things buried in
Muck, that should putrefie by little and little, or the like: For so oft as the
Imaginat doth think of those things, so oft doth he reprefent to his Imagination
the effect of that he defireth.
If there be any power in Imagination, it is less credible that it should be so incorporeal and immaterial a Virtue, as to work at great distances, or through all Mediums, or upon all Bodies; but that the distance must be competent, the Medium not adverse, and the Body apt and proportionate. Therefore if there be any operation upon Bodies in absence by Nature, it is like to be conveyed from Man to Man, as Fame is: As if a Witch by Imagination should hurt any afar off, it cannot be naturally, but by working upon the Spirit of some that comes to the Witch and from that party upon the Imagination of another, and so upon another, till it come to one that hath resort to the party intended; and so by him, to the party intended himself. And although they speak, that it sufficeth to take a Point, or a piece of the Garment, or the Name of the party, or the like; yet there is left credit to be given to those things, except it be by working of evil spirits.

The Experiments which may certainly demonstrate the power of Imagination upon other Bodies, are few or none; for the Experiments of Witchcraft are no clear proofs, for that they may be by a tacit operation of malignt Spirits; we shall therefore be forced in this Inquiry, to revert to new Experiments, wherein we can give only Directions of Tryals, and not any positive Experiments. And if any man think that we ought to have said till we had made Experiment of some of them our selves, (as we do commonly in other Titles) the truth is, that those Effects of Imagination upon other Bodies, have no little credit with us, as we shall try them at leisure: But in the mean time we will lead others the way.

When you work by the Imagination of another, it is necessary that he by whom you work have a precedent opinion of you that you can do strange things, or that you are a Man of Art, as they call it; for else the simple affirmation to another, that this or that shall be, can work but a weak impression in his Imagination. It were good, because you cannot discern fully of the strength of Imagination in one Man, more than another, that you did use the Imagination of more than one, that so you may light upon a strong one. As if a Physician should tell three or four of his Patients servants that their Master shall surely recover.

The Imagination of one that you shall use (such is the variety of Men's minds), cannot be always alike constant and strong; and if the success follow not speedily, it will faint and lose strength. To remedy this, you must pretend to him whose Imagination you use several degrees of Means by which to operate: As to prescribe him, that every three days, if he finde not the success apparent, he do use another Root, or part of a Beest, or Ring, &c. as being of more force; and if that fail, another; and if that, another, till seven times. Also you must prescribe a good large time for the effect you promise; as if you should tell a servant of a sick man, that his Master shall recover, but it will be fourteen days ere he finds it apparent, &c. All this to entertain the Imagination, that it waver less.

It is certain, that potions or things taken into the Body, Incenses and Perfumes taken at the Nostrils, and ointments of some parts, do naturally work upon the Imagination of him that taketh them. And therefore it must needs greatly cooperate with the Imagination of him whom you use, if you prescribe him, before he do use the Recet for the Work which he desires, that he do take such a Pill, or a Spoonfull of Liquor, or burn such an Incense, or anoint his Temples, or the Soles of his Feet, with such an Oyntment or Oyl: And you must chuse for the Composition of such Pill, Perfume, or Oynt-
Ointment, such Ingredients as do make the Spirits a little more gros or muddy, whereby the Imagination will fix the better.

The Body Passive, and to be wrought upon, (I mean not of the Imagination) is better wrought upon (as hath been partly touched at some times then at others; As if you should prescribe a servant about a sick person, (whom you have possessed that his Master shall recover) when his Master is fast asleep; to use such a Root, or such a Root. For Imagination is like to work better upon sleeping men, then men awake; as we shall shew when we handle Dreams.

We finde in the Art of Memory, that Images visible work better then other conceits; As if you would remember the word Philosophy, you shall more surely do it by imagining that such a Man (for Men are best places) is reading upon Aristotles Physicks, then if you should imagine him to say, I will go study Philosophy. And therefore this observation would be translated to the subject we now speak of; for the more lustrous the Imagination is, it filleth and fixeth the better. And therefore I conceive, that you shall in that Experiment (whereof we spake before) of binding of thoughts, let fail, if you tell one that such an one shall name one of twenty men, then if it were one of twenty Cards. The Experiment of binding of thoughts would be diversified and tried to the full: And you are to note, whether it hit for them most part, though not always.

It is good to consider upon what things Imagination hath most force: And the rule (as I conceive) is, that it hath most force upon things that have the lightest and easiest motions; and therefore above all upon the Spirits of Men, and in them upon such affections as move lightest: As upon procuring of Love, binding of Luft, which is ever with Imagination upon Men in fear, or Men in irresolution, and the like: Whatsoever is of this kind, would be thoroughly enquired. Tryals likewise would be made upon Plants, and that diligently: As if you should tell a man that such a Tree would die this year, and will him at these and these times to go unto it, to see how it thriveth. As for inanimate things, it is true, that the motions of shuffling of Cards, or casting of Dice, are very light motions; and there is a folly very useful, That Gamblers imagine, that some that stand by them, bring them ill luck. There would be trial also made, of holding a Ring by a thred in a Glafs, and telling him that holdeth it before, that it shal strike to many times against the side of the Glafs, and no more; or of holding a Key between two Mens fingers without a charm; and to tell those that hold it, that at such a name it shall go off their fingers. For these two are extreme light motions. And howsoever, I have no opinion of these things; yet so much I conceive to be true, That strong Imagination hath more force upon things living, or that have been living, then things meerly inanimate; and more force likewise upon light and subtle motions, then upon motions vehement or ponderous.

It is an usual observation, That if the Body of one murthered be brought before the Murtherer, the wounds will bleed afresh. Some do affirm, That the dead Body, upon the presence of the Murtherer hath opened the eyes; and that there have been such like motions as well where the party murthered hath been strangeld or drowned, as where they have been killed by wounds. It may be that this participatem of a miracle, by Gods just judgment, who usually brings murtherers to light. But if it be Natural, it must be referred to Imagination.

The tying of the point upon the day of Marriages, to make Men impo-
tent towards their Wives, which (as we have formerly touched) is so frequent in Zami and Gasony, if it be Natural, must be referred to the Imagination of him that戒指 the Point. I conceive it to have the least Affinity with Witchcraft, because not peculiar persons only (such as Witches are) but any Body may do it.

There be many things that work upon the Spirits of Men by Secret Sympathy and Antipathy. The Virtues of Precious Stones worn, have been anciently and generally received, and curiously assigned to work several Effects. So much is true, that Stones have in them fine Spirits, as appeareth by their Splendor: And therefore they may work by Contum upon the Spirits of Men, to comfort and exhilarate them. Those that are the boldest for that Effect, are the Diamond, the Emerald, the Jacynth Oriental, and the Gold-Flame, which is the yellow Topaz. As for their particular Proprietys, there is no Credit to be given to them. But it is manifest, that Light above all things, excelleth in comforting the Spirits of Men; and it is very probable, that Light varied doth the same Effect with more Novelty. And this is one of the Causes why Precious Stones comfort. And therefore it were good to have Tinted Lamps, or Tinted Shades of Glass coloured into Green, Blue, Carnation, Crimson, Purple, &c. and to use them with Candles in the Night. So likewise to have Round Glasses, not only of Glass coloured through, but with Colours laid between Crystals, with handles to hold in ones Hand. Prisms are also Comfortable Things. They have of Parce-work, Looking Glasses, bordered with broad Borders of small Crystal, and great Counterfeit Precious Stones of all Colours, that are most glorious and pleasant to behold, especially in the Night. The Pillures of Indian Feathers are likewise Comfortable and Pleasant to behold. So also fair and clear Pools do greatly comfort the Eyes too; especially when the Sun is not Glaring but overcast, or when the Moon shineth.

There are divers sorts of Bracelets fit to comfort the Spirits; and they be of three Intentions: Refrigerants, Corroborants, and Aperients. For Refrigerants I wish to be of Pearl, or of Coral, as is used. And it hath been noted that: Coral, if the Party that weareth it be ill disposed, will wax pale; which I believe to be true, because otherwise distemper of Heat will make Coral lose Colour. I commend also Beads or little Plates of Lapiz Lazuli, and Beads of Nine, either alone, or with some Cordial Mixture.

For Corroboration and Comfortation, take such Bodies as are of Allrigent quality without manifest cold. I commend Bead Amber, which is full of Aversion and yet is not and not cold, and is conceived to impinge those that wear such Beads. I commend also Beads of Hemi-Horn and Ivory, which are of the like Nature; also Orange-Beads, also Beads of lignum Aloes, macerated first in Rose-Water and dried.

For opening, I commend Beads, or pieces of the Roots of Cardam Benehiss, also of the Roots of Peony the Male, and of Orris, and of Calamum Aromaticus, and of Rew.

The Cramp (no doubt) comes of contraction of Sinews; which is manifest in that it cometh either by cold or drizzle, as after Consumptions and long Agues; for Cold and Drizels do (both of them) contract and Corrugate. We see also, that chafing a little above the place in pain, eall the Cramp; which is wrought by the Dilatation of the contracted Sinews by Heat. There are in Use for the Prevention of the Cramp, two Things: The one, Rings of Sea-Horse Teeth worn upon the Fingers; the other, Bands of
of Green Periwinkle (the Herb) tied about the Calf of the Leg, or the Thigh, &c. where the Cramp uleth to come. I do finde this the more strange, because neither of thele have any Relaxing Virtue, but rather the contrary. I judge therefore that their working is rather upon the Spirits within the Nerves to make them strive least, then upon the Boodily substance of the Nerves.

I would have tryal made of two other kindes of Bracelets for confor- 965. ting the Heart and Spirits. The one of the Trochishe of Vipers made into little pieces of Beads; for since they do great good inwards (espe- cially for pestilent Agues) it is like they will be effectual outwards, where they may be applied in greater quantity. There would be Trochishe likewise made of Snakes, whose flesh dried is thought to have a very opening and Cordial Virtue. The other is of Beads made of the Scarlet Powder, which they call Kermes, which is the principal Ingredient in their Cordial-Confiniion Ailkers. The Beads would be made up with Amber-Griece, and some Pomander.

It hath been long received, and confirmed by divers tryals, that the Root of the Male-Pony dried, tied to the Neck, doth help the Fall- 966. ing-Sicknes; and likewise the Inebus, which we call the Mart. The caufe of both these Diseases, and especially of the Epilepti from the Stomack, is the gross- nels of the Vapors which rise and enter into the Cells of the Brain: And therefore the working is by extream and subtil Attenuation, which that Simple hath. I judge the like to be in Casscourage, Musk, Ren-Seed, Agues Caflus-Seed, &c.

There is a Stone which they call the Blood-Stone, which worn is thought to be good for them that bleed at the Nose; which (no doubt) is by attrition and cooling of the Spirits. Quære, if the Stone taken out of the Tands Head, be not of the like virtue, for the Toad loveth Shade and Coolness.

Light may be taken from the Experiments of the Horse-tooth Ring, and the Garland of Periwinkle, how that those things which assuage the Strife of the Spirits, do help diseases, contrary to the Intention desired; for in the curing of the Cramp, the Intention is to relax the Sinews; but the contraction of the Spirits, that they strive least, is the best help: So to procure safe Travels of Women, the Intention is to bring down the Child; but the help is, to stay the coming down too fast; whereunto they say the Toad-stone-like- 968. wise helpeth. So in pestilent FEVERS, the Intention is to expel the Infection by Sweat and Evaporation; but the best means to do it, is by Nitre, Diversium, and other cool things, which do for a time arrest the Expulsion, till Nature can do it more quietly. For as one faith prettily, in the quenching of the flame of a pestilent Ague, Nature is like People that come to quench the Fire of an House; which are so busy, as one of them letteth another. Surely it is an excellent Axiome, and of manifold use, that whatsoever appealeth the contention of Spirits furthereth their action.

The Writers of Natural Magick commend the wearing of the spoil of a Snake, for preferring of Health. I doubt it is but a conceit; for that the Snake is thought to renew her youth by casting her spoil. They might as well take the Beak of an Eagle, or a piece of a Harts-horn, because those renew.

It hath been anciently received, (for Pericles the Athenian used it) and it is yet in use, to wear little Bladders of Quick-silver, or Tablets of Arle- 969. nick, as preservatives against the Plague: Not, as they conceive, for any comfort they yield to the Spirits; but for that being poisons themselves, they draw the venom to them from the Spirits.
Vide the Experiment 35, 96, and 97. touching the several Sympathies and Anymathies for Medicinal use.

It is said, that the Guts or Skin of a Woolf being applied to the Belly do cure the Colick. It is true, that the Woolf is a Beast of great Edacity and Digellion; and so it may be the parts of him comfort the Bowels.

We see Scare-crows are set up to keep Birds from Corn and Fruit. It is reported by some, that the Head of a Woolf, whole, dried and hanged up in a Dove-bonc, will leare away Vermin, such as are Weasels, Pole-cats, and the like. It may be the Head of a Dog will do as much: for those Vermin with us, know Dogs better then Wolves.

The Brains of some Creatures, (when their Heads are rosted) taken in Wine, are said to strengthen the Memory; as the Brains of Hares, Brains of Hens, Brains of Deer, &c. And it ficmeth to be incident to the Brains of those Creatures that are fearfull.

The Oynment that Witches use, is reported to be made of the Fat of Children digged out of their Graves; of the Juices of Smallage, Woolbane, and Chicquetoil, mingled with the Meal of Fine Wheat. But I suppose, that the Soporiferous Medicines are likelit to do it; which are Henbane, Hemlock, Mandrake, Moonshine, Tobacco, Opium, Baffron, Poplar leaves, &c.

It is reported by some, that the affections of Beasts when they are in strength, do add some virtue unto inanimate things: As that the Skin of a Sheep devoured by a Woolf moveth itching; that allone bitten by a Dog in anger, being thrown at him, drunk in Powder provoketh Choler.

It hath been observed, that the diet of Women with Childe, doth work much upon the Infant: As if the Mother eat Quinces much, and Coriander-seed (the nature of both which, is to repress and stay vapors that ascend to the Brain) it will make the Childe ingenuos: And on the contrary side, if the Mother cat (much) Onions or Beans, or such vaporous food, or drink Wine or strong drink immoderately, or fast much, or be given to much musing, (all which send or draw vapors to the Head) it indangereth the Childe to become Lunatick, or of imperfect memory: And I make the same judgment of Tobacco often taken by the Mother.

The Writers of Natural Magick report, that the Heart of an Ape worn near the Heart, comforteth the Heart, and increaseth audacity. It is true, that the Ape is a merry and bold Beast. And that the same Heart like wise of an Ape applied to the Neck or Head, helpeth the Wit, and is good for the Falling sicknes. The Ape also is a witty Beast, and hath a dry Brain; which may be some cause of attenuation of Vapors in the Head. Yet it is said to move Dreams also. It may be the Heart of a Man would do more, but that it is more against Mens minde to use it except it be in such as wear the Reliques of Saints.

The Flesh of a Hedghog dressd and eaten, is said to be a great dryer. It is true, that the Juice of a Hedghog must needs be hard and dry, because it puteeth forth so many Prickles: For Plants also that are full of Prickles are generally dry; as Bryars, Thorns, Barberries. And therefore the ashes of a Hedghog are said to be a great desiccative of Fiftula's.

Mummy hath great force in stanching of Blood; which as it may be ascribed to the mixture of Balm that are Glutinous, so it may also parake of a secret propriety, in that the Blood draweth Mans flesh. And it is approved, that the Mois which groweth upon the Scull of a Dead Man unburied will stanch Blood potently. And so do the drags or powder of Blood, seuered from the Water and dried.
It hath been practised to make White Swallow, by anointing of the Eggs with Oyl. Which effect may be produced by the hopping of the Pores of the Shell, and making the Juice that putteth forth the Feathers afterwards more penurious. And it may be, the anointing of the Eggs will be as effectual as the anointing of the Body. Of which, Vide the Experiment 93.

It is reported, that the White of an Egg or Blood mingled with Salt-water, doth gather the fatness, and maketh the water sweeter. This may be by Adhesion; as in the Sixth Experiment of Clarification. It may be also, that Blood, and the White of an Egg, (which is the matter of a Living Creature) have some Sympathy with Salt; for all Life, hath a Sympathy with Salt. We see that Salt laid to a cut finger, healeth it; so, as it seemeth, Salt draweth Blood, as well as Blood draweth Salt.

It hath been anciently received, that the Sea-Hare hath an antipathy with the Lungs, (if it cometh near the Body) and erodeth them. Whereof the cause is conceived to be a quality it hath of heating the Breath and Spirits; as Cantharides have upon the watry parts of the Body, as Urine and Hydropical Water. And it is a good rule, That whatsoever hath an operation upon certain kindes of Matters, that in Mans Body worketh most upon those parts wherein that kind of matter aboundeth.

Generally that which is Dead, or Corrupted, or Excerced, hath antipathy with the same thing when it is alive, and when it is found, and with those parts which do excerner: As a Carcass of Man is most infectious and odious to Man, a Carcass of an Horse to an Horse, &c. Purulent matter of Wounds and Ulcers, Carbuncles, Pox, Scabs, Leprosie, to found Flesh; and the Excrements of evety Species to that Creature that excernet them. But the Excrements are les odious then the corruptions.

It is a common experience, That Dogs know the Dog-killer, when as in times of Infection some pett fellow is sent out to kill the Dogs; and that though they have never seen him before, yet they will all come forth, and bark, and fie at him.

The Relations touching the Force of Imagination, and the Secret Instincts of Nature, are so uncertain, as they require a great deal of Examination ere we conclude upon them. I would have it first thoroughly inquired, whether there be any secret passages of Sympathy between Persons of near Blood; as Parents, Children, Brothers, Sisters, Nurses-children, Husbands, Wives, &c. There be many reports in History, that upon the death of Persons of such nearness, Men have had an inward feeling of it. I my self remember, that being in Paris, and my Father dying in London, two or three days before my Fathers death, I had a dream, which I told to divers English Gentlemen, that my Fathers House in the Country was Plaistered all over with Black Mortar. There is an opinion abroad, (whether idle, or no I cannot say) That loving and kinde Husbands have a sense of their Wives breeding Child by some accident in their own Body.

Next to those that are near in Blood, there may be the like passage and instincts of Nature between great Friends and Enemies. And sometimes the revealing is unto another person, and not to the party himself. I remember Philippus Cominew (a grave Writer) reported, That the Archbishops of Vienna (a Reverend Prelate) laid (one day) after Mass to King Louis the Eleventh of France, Sir, Your Mortal Enemy is dead; what time, Charles Duke of Burgundy was slain at the Battle of Granjon against the Swissers. Some trial alfo would be made, whether Paet or Agreement do any thing; as if two Friends should agree, That such a day in every Week, they being in far distant places,
should pray one for another, or should put on a ring or Tablet one for another's sake; whether, if one of them should break their Vow and Promife, the other should have any feeling of it in ablenoe.

If there be any force in Imaginations and Affections of singular Persons, it is probable the force is much more in the Joynt Imaginations and Affections of Multitudes; as if a Victory should be won or lost in remote parts, Whether is there not some sense thereof in the people whom it concerneth, because of the great joy or grief that many men are possessed with at once? Pius Quintus, at the very time when that memorable victory was won by the Christian against the Turks, at the Naval Battle of Lepanto, being then hearing of Caules in the Conflitory, brake off suddenly, and said to those about him, It is now more then time we should give thanks to God for the great Victory he has granted us against the Turks. It is true, that Victory had a Sympathy with his Spirit, for it was meerly his work to conclude the League; it may be that Revelation was Divine. But what shall we say then to a number of Examples amongst the Greeks and Romans, where the People being in Theatres at Plays, have had news of Victories and Overthrows some few days, before any Messenger could come?

It is true, that that may hold in these things which is the general Root of Superfiction; namely, that men observe when things hit, and not when they miss, and commit to Memory the one, and forget and pass over the other. But touching Divination and the misgiving of Minds, we shall speak more when we handle in general the Nature of Minds, and Souls, and Spirits.

We having given formerly some Rules of Imagination, and touching the fortifying of the same; we have set down also some few Instances and Directions of the force of Imagination upon Beasts, Birds, &c. upon Plants, and upon Inanimate Bodies: Wherein you must still observe, that your Tryals be upon Subtil and Light Motions, and not the contrary; for you will sooner by Imagination bind a Bird from Singing then from Eating or Flying; and I leave it to every man to chuse Experiments which himself thinketh most commodious, giving now but a few Examples of every of the three kinds.

Use some Imaginant (observing the Rules formerly prescribed) for binding of a Bird from singing, and the like of a Dog from barking. Try also the Imagination of some, whom you shall accommodate with things to fortifie it in Cock-fights, to make one Cock more hardy, and the other more cowardly. It would be tried also in flying of Hawks, or in coursing of a Deer or Hart with Grey-hounds, or in Horse-races, and the like comparative Motions; for you may sooner by Imagination, quicken or slack a motion, then raise or cease it; as it is easier to make a Dog go forward, then to make him stand still, that he may not run.

In Plants also you may try the force of Imagination upon the lighter sort of Motions; as upon the sudden fading or lively coming up of Herbs; or upon their bending one way or other, or upon their closing and opening, &c.

For Inanimate things, you may try the force of Imagination upon staying the working of Beer, when the Barm is put in; or upon the coming of Butter or Cheefe, after the Churning, or the Rennet be put in.

It is an ancient Tradition, every where alleged, for example of secret Proprieties and Influxes, That the Torpedo Marina, if it be touched with a long stick, doth stupeifie the hand of him that toucheth it. It is one degree of working
Century X.

working at distance, to work by the continuance of a fit Medium; as Sound will be conveyed to the Ear by striking upon a Bow-string, if the Horn of the Bow be held to the Ear.

The Writers of Natural Magick do attribute much to the Virtues that come from the parts of Living Creatures, so as they be taken from them, the Creatures remaining still alive; as if the Creature still living did infuse some immateriate Virtue and Vigor into the part severed. So much may be true, that any part taken from a Living Creature newly slain, may be of greater force, than if it were taken from the like Creature dying of itself; because it is fuller of Spirit.

Tryal would be made of the like parts of Individuals in Plants and Living Creatures; as to cut off a Stock of a Tree, and to lay that which you cut off to putrefic; to see whether it will decay the rest of the Stocks; or if you should cut off part of the Tail, or Leg of a Dog, or a Cat, and lay it to putrefic, to see whether it will fester, or keep from healing, the part which remaineth.

It is received, that it helpeth to continue love, if one wear a Ring or a Bracelet of the Hair of the party beloved. But that may be by the exciting of the Imagination; and perhaps a Glove, or other like Favor, may as well do it.

The Sympathy of Individuals that have been entire; or have touched, is of all others, the most incredible; yet according unto our faithful manner of Examination of Nature, we will make some little mention of it. The taking away of Warts, by rubbing them with somewhat that afterwards is put to waste and confume, is a common Experiment; and I do apprehend it the rather, because of mine own experience. I had from my Childhood a Wart upon one of my Fingers; afterwards, when I was about sixteen years old, being then at Paris, there grew upon both my hands anumber of Warts (at least an hundred) in a moneths space. The English Ambassadors Lady, who was a Woman far from Superstition, told me one day she would help me away with my Warts. Whereupon she got a piece of Lard with the skin on, and rubbed the Warts all over with the fat side, and amongst the rest that Wart which I had from my Childhood; then she nailed the piece of Lard, with the fat towards the Sun, upon a post of her Chamber-window, which was to the South. The success was, that within five weeks space all the Warts went quite away, and that Wart which I had so long endured, for company. But at the rest I did little marvel, because they came in a short time, and might go away in a short time again; but the going of that which had stuck so long doth yet stick with me. They say the like is done by rubbing of Warts with a green Elder-flick, and then burying the flick to rot in muck. It would be tried with Corns and Wens, and such other Excrescences: I would have it also tried with some parts of Living Creatures that are nearest the nature of Excrescences; as the Combs of Cocks, the Spits of Cocks, the Horns of Beasts, &c. and I would have it tried both ways: both by rubbing those parts with Lard or Elder as before; and by cutting off some piece of those parts, and laying it to confume, to see whether it will work any effect towards the Consumption of that part which was once joyned with it.

It is constantly received and avouched, that the anointing of the Weapon that maketh the Wound, will heal the Wound it self. In this Experiment, upon the relation of men of credit, (though my self, as yet, am not fully inclined to believe it) you shall note the Points following. First, the Ointment wherewith this is done, is made of divers Ingredients; whereof the strangest
strangest and hardest to come by, are the Mois upon the Skull of a dead Man unburied, and the Fats of a Boar, and a Bear killed in the Act of generation. These two last I could easily suspect to be prescribed as a startling hole, that if the Experiment proved not, it might be pretended, that the Beasts were not killed in the due time; for as for the Mois, it is certain there is great quantity of it in Ireland, upon slain Bodies laid on heaps unburied. The other Ingredients are the Blood-stone in Powder, and some other things which seem to have a virtue to stanch blood, as also the Mois hath. And the description of the whole Oyntment is to be found in the Chymical Dispensatory of Crollius. Secondly, The same kind of Oyntment applied to the hurt itself, worketh not the effect, but only applied to the weapon. Thirdly, (which I like well) they do not observe the confecting of the Oyntment under any certain Constellation; which commonly is the excuse of Magical Medicines when they fail, that they were not made under a fit figure of Heaven. 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 needful to concur, for it may be done without the knowledge of the party wounded: And thus much hath been tried, that the Oyntment (for Experiments take) hath been wiped off the Weapon without the knowledge of the party hurt, and presently the party hurt hath been in great rage of pain, till the weapon was reanointed. 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 anointing of that Instrument will serve and work the effect. This I doubt should be a device to keep this strange form of Cure in request and use, because many times you cannot come by the Weapon itself. Seventhly, the Wound must be at first washed clean with White-wine, or the parties own Water, and then bound up close in fine Linnen, and no more dressing renewed till it be whole. Eighthly, the Sword it self must be wrapped up close as far as the Oyntment goeth, that it take no wind. Ninthly, the Oyntment, if you wipe it off from the Sword and keep it, will serve again, and rather increase in vertue then diminish. Tenthly, it will cure in far shorter time, then Oyntments of Wounds commonly do. Lastly, it will cure a Beast as well as a Man; which I like best of all the rest, because it subjecteth the matter to an easie tryal.

Would have Men know, that though I reprehend the easie passing over of the causes of things, by ascribing them to secret and hidden virtues and proprieties (for this hath arrested and laid asleep all true Inquiry and Indications;) yet do I not understand, but that in the practical part of knowledge much will be left to Experience and Probation, whereunto Indication cannot so fully reach; and this is not onely in Species, but in Individuo. So in Physick, if you will cure the Jaundies, it is not enough to say, that the Medicine must not be cooling, for that will hinder the opening which the disease requireth; that it must not be hot, for that will exasperate Choler; that it must go to the Gall, for there is the obstruction which causeth the disease, &c. But you must receive from Experience, that Powder of Chamaepyris, or the like, drunk in Beer, is good for the Jaundies. So again, a wise Physician doth not continue still the same Medicine to a Patient, but he will vary, if the first Medicine doth not apparently succeed; for of those Remedies that are good for the Jaundies, Stone, Ague, &c. that will do good in one Body, which will not do good in another, according to the correspondence the Medicine hath to the Individual Body.

The
The delight which Men have in Popularity, Fame, Honor, Submission, and Submission of other Mens Minds, Wills, or Affections (although these things may be desired for other ends) seemeth to be a thing in itself, without contemplation of consequence, grateful, and agreeable to the Nature of Man. This thing (surely) is not without some signification, as if all Spirits and Souls of Men came forth out of one Divine Limbus; else, why be Men so much affected with that which others think or say? The best temper of Minds, desireth good Name and true Honor; the lighter, Popularity and Applause; the more depraved, Submission and Tyranny; as is seen in great Conquerors and Troublers of the World, and yet more in Arch-Hereticks, for the introducing of new Doctrines, is likewise an affection of Tyranny over the Understandings and Beliefs of Men.
# TABLE

Of the chief Matters contained in the CENTURIES.


| B. | Air turned into water, 6. By four several ways, ibid. Influences tending there-to, 20, 21. Converted into a dense body, a rarity in Nature, 7. Hath an antipathy with tangible bodies, 21. Converted into water by repercussion from hard bodies, ibid. Air turned into water by the same means that it, ibid. Congeding of air, 50. Air condensed into weights |}


| E. | Air turned into water, 6. By four several ways, ibid. Influences tending there-to, 20, 21. Converted into a dense body, a rarity in Nature, 7. Hath an antipathy with tangible bodies, 21. Converted into water by repercussion from hard bodies, ibid. Air turned into water by the same means that it, ibid. Congeding of air, 50. Air condensed into weights 156 |}

A Table of the chief Matters

Antipathy in other kindes, 209, 210, 211, 212, 213. Antipathy between enemies in absence. 10.

Appetite of continuation in liquid bodies 5, 6

Appetite in the stomach, 176. What qualities provoke it, ibid. Four causes thereof ibid.


Apple-cions grafted on the stock of a Colewort 97

Apple-trees, some of them bring forth a sweet Moss 114

Aqua-Soris diffusing iron 166

Archbishop of Uyarrus his revelation to Lewis the Eleventh 211

Arrows with wooden-heads sharpened to pierce wood sooner, then with iron heads 148

Artichokes made least prickly 98

Art of memory 27

Aires in a vessel, will not admit equal quantity of water, as in the vessel empty 10

Aires an excellent compass 123

Aire caufeth cale death 132

Affimilation in bodies inanimate, 24. In vegetables ibid. 29, 179

Affllication prohibiteth patience 75

Attrition by multitude of substance 148

Audibleas mingle in the medium, which victorious do not, 72. The cause thereof, ibid. Several Confents of audibles and visibles, 83, 56. Several Distincts of them, 86, 61.

Audibles and Visibles 264

Authority strengthen Imagination 266

B

Age growing in the fields 115

Barrel empty knocked, faid to give a Diapason to the same Barrel Full 45

Barrenness of Trees, the cause 100

Basil turned into VVilde Thyme 111

Basilisk 202

Barking the body, 156. Would not be healthful for us, if it were to use, ibid. for the Turtles good 15.

Bearing in the womb, in some creatures longer, in some shorter 159

Beasts do not imitate Man's speech as Birds do, 55. The cause, ibid. Beasts communicating in species with one another, 138. Likewise some Birds, ibid. Beasts in their

kinder, lesser then Fishes, 134. Greater than Birds, the cause ibid.

Beasts that yield the tail or vitrue of the tail your beast on 104

Bears for new Rain 176

Caynon Bear, how made, 17. A very nourishing drink ibid.

Bees humming an unequal sound 43

Birds have another manner in their quickening, then ME or Beasts, 25. Bird communicating in species with one another, 179. Swifter in motion than Beasts, ibid. The cause, ibid. In their kindes lesser then Beasts or Fishes, 84. The cause, ibid. imitate Man's speech, which Beasts do, not 55. The cause ibid.

Bird of living creatures 78

Blacks the best colour in Plumbs 169

Blite-eyes infections 20.

Bleeding of the body, at the approach of the murrimer 207

Blood give meane of extaing it 17

Blood draweth salt 211

Bird of the Cattle-fish 156

Blood-None 210

Blows and bruizes induce swelling, 187. The cause ibid.

Bowing an hole through a Tree, helpeth it 54

Body bristle bracken 3. Bodies natural most of them have an appetite of admiring others into them, 160. Except Man, ibid. Bodies unperfectly mixt 178

Bodies in nature that gave po sounds, and that give sounds 37, 33, 34

Bodies, to which, VVine is hurtful, and to which, good 153

Bodies conserve a long time 162, 163

Boldness and idleness, the power of them in civil businesses 196, 203

Boleus 311

Bolus Conemen 147


Boiling canseeth Grains to swell in difference 185

Bracelets worn which comfort the spirits, 179. Their three several operations, ibid.

Brain increased in the Full Moon 210

Brain sensitive of wounds 166

Breast plates cause swelling 187

Breath held, helpeth breathing, 67. The cause ibid.

Bryer.
contained in these Centuries.

Bryer, 40s 117

Bringing forth many at a birth, and hot one, 167. The cause of each 183 ibid.

Burning glasses rare 34

Burning some Vegetables upon the ground, enriched it 172

Borage of infused 4

C.

Cake growing on the side of a dead tree 179

Calamites 157

Candles of several mixtures, 82. Of several wicks, 83. Laid in bran for lifting, ibid.

Cantharides, wherefore ever applied, affect the Bladder, 27, 211. The Flies Cantharides, 155. Of what substance they are bred, ibid.

Carrying of foreign Roots safe 128

Caffia 153

Casting of the skin or shell, 154. The creatures that cast either 154

Catapillars 153

Cements that grow hard 183

Chalk, a good compost, 122, 123. Good for pasture, as well as for Arable land 122

Chamomile, 80. Their nourishment, ibid, 80

Chamomelle Paper 156

Change in Medicines and Aliments good, 18. The cause why 157

Charcoal vapor in a close room, mortal 202

Charms 205

Cheap fuel 164


Chintzes 71

Cooler rule the Stock, 93. Must be superior to it, 99. Cion reguarded 97

Cunnynson, 128. The Propertises of that Tree 128

Citon, Grafted on a Quince 110

Clammy Bodies 64, 65

Clarifying of Liquors by Adhesion, 2. Of water, running 71


Clarification of Plants 162

Cloves, attractive of Water 21

Clothing of Plants 99

Coffee, a Berry making Drink in Turkey 155

Cold, 10. Production of it, a very noble work, ibid. Seven means to produce it, ibid. 20. Prunum trigonum, the Earth, 10. Transitive into Bodies adjacent, as well as Heat, ibid. All tangible bodies of themselves, cold, ibid. Density, cause of cold, ibid. Quick spirit in a cold body, increased with cold, ibid. 25. Chasing away of the warm spirits, increase of cold, ibid. Exhaling of the warm spirits, and the like, ibid. Cold prohibition Putrefaction, 75. Irritaticn Flame 83

Cold having mortified any part, how to help it 166

Columbrus furthered in their growth by Seweed, 96. By being watered with Salt-water, 98. Hurf Neighbor Plants 121

Collick cured by application of woolshugs 210

Collection 73

Coloquintida 292


Comforting of the Spirits of Men by several things 209


Concealment, 179. The word left restrained then formerly, ibid. Not the work of Heat alone, ibid. The two periods of it ibid.

Concords in Music 30

Concretion of Bodies, 131. Dissolved by the contrary ibid. Condensing Medicines to relieve the Spirits 153

Condensing of Air into weight 156

Con-
A Table of the chief Matters

Congelation of Air 80
Conservation of bodies long time, 162, 161. The causes and help thereof ibid.
Conservation of bodies in Quick-silver 168
Confidence of bodies 180
Consumptions in what Airs recovered 204
Contiguous things: their operations 201
Coppice-woodsibusied 93
Coral 126, 165
No Core in Fruits 110
Corn changed by sowing often in the same ground, 111. Changed into a sauer kind by the fertility of the year, ibid. The Diceses thereof, 156. The remedy of the Diseases, ibid. 137. Choice of the best Corn ibid.
Corruptions 73
Court of Vulcan, near Putaeuli 165
Cramp, 211, 212. Two cures of it ibid.
Creatures moving after the swelling of the head, 88. The causes thereof ibid.
Cruelly 179
Cucumbers made to grow sooner, 96. To hear two years, ibid. By steeping their Seeds in Milk, prove more dainty, 98. Made more delicate by throwing in chaff when they are set, ibid. They excessively affect moisture, ibid. VVill grow towards a pot of water. ibid.
Cure by sylph, 17. Caution to be used in diseases counted incurable, ibid. Cure by excreta, ibid. The cause of it, ibid. Cure by motion of constern, ibid. Physicians how to make use of this motion ibid.
Curiosity of touching Plants, 107, 108, 109, 110
Cutted leaves in Plants 133
Cutting Trees often, causeth their long lasting 120
Cutty blood 156

D.

Damps from mines and minerals 202
Day flowers, not faged for Fruits as night-flowers 135
Death without pain 222
Decotion maketh Liquors clearer, Infusion thicker, 68. The cause ibid.
Dex, 159. Their generating ibid.
Degenerating of Plants, 110, 111. The several causes thereof ibid.
Democritus 203
Deciscation 74
Dew upon Hills, better then upon Valleys 165
Diamonds Cornish 2
Diapason, the sweetest of Sounds, 30. The

Dipsas or number of Eight, rather a thing received, then a new computation, ibid. Half Notes of Necessity between the Unison and Diapason ibid.
Diet, drinks, 29. Most troublesome at first ibid.
Differences of Plants 121, 122
Differences of several positions in matter 182
Digging of the Earth healthful 263
Diseases in Mickle 30, 31
Diseases contrary to predisposition, 17. What the Physician is to do in such cases, ibid.
Diseases, infections, 65. Diseases epidemic 85
Diseases, pleasures and perverses of the senses 145
Displeasure light, 151. The impressions thereof ibid.
Distillation of Iron in Aquafortis 166
Dissociation Natural 172
Tongues the Dog-killer 211
Double flowers 108, 110
Down upon the leaves of Plants, 117. The virtues of such leaves ibid.
Dreams pleasant and prophetic procured by sense smells 264
Drinks, 69. The maturation of them, ibid. How it is wrought, ibid. VVhat is different from crystallization, ibid. Degrees of Osmation in several Liquors, ibid. Maturation by enforcing the motions of the Spirits, ibid. Quickning of drinks that is dead ibid.
Drowning of Metals 168, 169
Drunken men, 152. Their sperm unfruitful, 153. They are unfit for voluntary motion, ibid. Imagine false things as to the eye, ibid. Distempered sooner with small draughts, then with great ibid.
Drying the adventitious moisture, prohibiteth putrefaction, 76. Mixture of dry things, prohibits it ibid.
Dullible Bodies 181, 182
Duliration of things, 133. Of Metals 79,
Of plants by several ways, 186. The causes of them ibid.
Drugs of Beefs to enrich grounds, 121. Which of them the best ibid.
Dust maketh Trees fruitful 116
Drowning of Trees 113

E.

Ear dangerous to be picked in pawning 140
Early Flowers and Plants 119
Earth and Sand differ, 1. Earth Primus Frigldum, 19. Infusions in Earth, 83. The effects thereof, ibid. Caustics to be used therein, ibid. Several infusions thereof, ibid.
contained in these Centuries.

...Earth taken out of the Vaults will put forth Herbs. 117. The nature of these Herbs, ibid. What Earth is seen out of Shady and muddy woods will put forth, ibid. Earth upon Earth, a good Compost, 123. Earths good and bad, 156. Earths Medicine, 147. Earth taken near the River Nym, 156. Earth pure, the health of all smell of all 203.

Ebbing and Flowing of the Sun 200.


Eggs, the solvs of them great nourishers, 14. How to be used, ibid. To be conduceth more to the nourishment. It is, to the generation of the Bird 25.

Elder, the sweetest Conduit in Mufk 30.

Elder stick put to consume, taketh away warts 213.

Electrum 168.

Electric Bodies, ibid.

Engrafted 100.

Enforcing a thought upon another, 204. Instances thereof, in a Jugglers trick, ibid. Three means by which it might be wrought 202, 26.

Englishman burnt in the Leg, burns to cure 166.

Epsy 203, 204.

Epidemical Diseases 85.


Eweums 143.

Experiments of living creatures smell ill, 177. The caufe, 178. Some smell well, ibid. The cause, ibid. Must adviss to a creature of the same kind.

Experiments of Plants, 118, 119, Ch. Two ways for Exerecizes, 116. Exerecizes joined with Purgation 117.

Exerecizes, 65. To what Bodies hurtful, ibid. Not to be used with a persicic, ibid. Results of Exerecize, ibid. Evils of exer-

cise, ibid. Exercise impregnating not so much as frictios 190. The cause, ibid.

Eye of the Underfunning, like the Eye of Sore 24.

The Eyes, 188. Both move one way, ibid. See better one eye first, ibid. The cause, ibid. Why some see one thing double, ibid. Pure-blinde men see left near-hand, ibid. The cause, ibid. Old men at some distance ibid.

Eyes are offended by over-great Light 119.

By entrancing of Light and Darknefs on the Sudden, ibid. By small Pains, ibid. Wax red in Angle, in Blushing, ibid. The cause of each, ibid. Eye re-placed, hath recovered sight 88.

F 40.

Fable of Hercules and Hydas 40.

Falling-jinks, how helped 210.

Falsification 200.

Fat extracted out of flesh 132.

Fear, 149, 266. The impressions thereof 149, 150.

Feathers of Birds, why of such for colour, 1.

How the colour of them may be changed, 24, 25. Age changeth them 14.

Feathers burnt, suppress the Mother 254.

Female and Male in Plants, 126. The differences of Female and Male in several living creatures, 184.

The causes thereof ibid.

Fetid smells 175, 178.

Fiery Bodies 168, 182.

Flies in the Spring, 96. Indian Fly 127.

Figures, and not Figurable 182.

Figures of Plants 121.

Figure, or Tropes in Mufk, have an agreement with the Figures of Rhetoric 36.

Fire, and never the Cold, 81.

Fire and hot water, heat differently, ibid.

Fire subterrany 80.

Fire and Air, fore, minds 174.

Fish of the Sea, put into fresh water 147, 148.

Fishes, Aquatic 175.

Fishes greater than any Br. 184. The cause ibid.

Fishe, 169.

Fixation of Bodies 169.

A Table of the chief Matters

<table>
<thead>
<tr>
<th>of the Element of Fire, ibid. Preyeth upon Oil, as Air upon Water, Water, takes in no other Body into it, but comest with it, 169. Flame causing water to rise, 192.</th>
<th>ibid.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame. 81. The continuance of it according to several Bodies, ibid. Observation about going out of Flame, ibid.</td>
<td>ibid,</td>
</tr>
<tr>
<td>stair</td>
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contained in these Centuries.

Opinion of moving to the Centre, a vanity 10

Greatness, comparative of living Creatures 184

Greenness in some Plants all Winter, ibid. 121, 122. The cause ibid.

Grief and pain, ibid. 150. The impressions there-
of ibid.

Growing of certain Fruits and Herbs, after they are gathered, ibid. 7, 8. The cause, ibid.

Try'd, whether they increase in weight, ibid.

Growing or multiplying of Metals 168

Gum of Trees 2

Gum-powder, 3. The cause of the great noise it yields, ibid. White girth no found 150

Sun, Fire, and Living Creatures, ibid.

Heat within the Earth, ibid. 191. Try'd of drawing it forth by the Moon-beams ibid. 193

Heats under the Aquinclamation, ibid. thereunder by the Terrid Zones ibid. 57. Three causes thereof ibid.

Heathen opinion touching the Generation of Creatures, perfall by Concretion, refus'd 194

Heavily Bodies, true Fires 195

Hedge-hog's flesh, a good dryer 113

Helleboras, 114. The causes of their opening and shutting, or bending towards the Sun ibid.

Hemlock casts the death 112

Herbs removed from Birds into Pots, profper better, 98. Grow sweeter by cutting off the first Sprout, ibid. 99. The cause thereof ibid. Inquiry, whether they be made Medicinal and how, ibid. 105. Four designations of it, ibid. Their ordinary colours, ibid. 109.

Herbs growing out of the water without Roots, ibid. 117. Growing out of the top of the Sea without Roots, ibid. 118. Growing out of Snow, ibid. Growing out of Snow, ibid. Growing in the bottoms of Mines, ibid. None growing out of Seas, ibid. Herbs dying yearly, ibid. That last many years, ibid. The largest leaf, not longest, as the largest Trees do, ibid. The cause, ibid. Herb in likeness of a Lamb, ibid. 127. The Fable of it, ibid. Herbs will show the nature of the ground, ibid. 135. Herbs which like to be watered with Salt-water, ibid. 137. Herbs foretell rain 176

Hicough, 147. The cause of it, ibid. Means to cause it ibid.

Honey, 127, 183. Several ways how it is used ibid.

Honey-dews upon certain Leaves and Flowers 104

Horns, 157. Horn'd Beasts have no upper Teeth 158

Horse flesh eaten, 186. Horse Tooth the mark of their age, ibid. 158. Horse Tooth Ring good for the Cramp 111, 112

His bread nourishing in the odors thereof 203

Humors ill lodged, very dangerous 18

I.

Aol, a most pernicious smell 201

Pemlay 115

Image, whether it might be seen without seeing the Glass 160

Imagination excited, 198. Force of it, ibid. 199. Three Cautions about the same; Vorke's must upon weak persons, ibid.
A Table of the chief Matters

Imagination, 206. The kinds of it, ibid.
The force of it upon another body, ibid.
207. Several instances of it, ibid. & c.
An instance thereof by a Pair of Cardz, ibid. Three means to impose a
Thought, 206, 207. Designation for tryal
of the operations in this kind, ibid. 207.
To work by one that hath a good opinion
of you, ibid. To work by many, ibid.
Means to preferre Imagination in the
strength, ibid. It works more at some
times, then others, ibid. It hath most
force upon the highest motions, ibid. 208,
209, 210. Effects of the Sense
168
Imaginations imitating the imitations of
Nature, 1. Imagination in Men, and other
Creatures, 55. A thing to be wonder
at, ibid. Several motions in Men of Imi-
tation 65
Imperceptible, and not imperceptible 182
Imitation and persuasion of B. dies, 162, 161.
Impulsion of a Body unequal 167
Inanimate and Aimate, wherein they differ
125
Lecture, thought to dispose to devotion by the
operation of the small 204
Inciting, how helped 210
Indian Earth brought over, hath produced
Indian Plants, 118. Indian Fig 127
Indian Tree with Leaves of great largeness,
and Fruit without stakes ibid.
Inboration of Bodies, 22. Three means to
effect it, ibid. Examples thereof, ibid. 23.
Inboration by Snow or Ice, ibid. By Met-
talline waters, ibid. In some natural
Spring-waters, ibid. Of Metals by heat
ing and quenching, ibid. By fire, ibid.
By Decotions within water, the water not
touching, ibid. 24. Induration by Sympa-
thy 182
Infant in the Womb, suffering from the Moth
ers diet 113
Infusious Diseases 65
Influences of the Moon, 192, 197, 194. In
number four ibid.
Influences of the heavenly Bodies. 200
Infusion in Liquors, 4. A short stay of
ibid. Infusions to be iterated, ibid. Use
ful for Medicinal operations, ibid. Thral
which parts issue found, which flows, 5.
Evaporations of the finer Spirits, some
times useful ibid.
Infusion make Liquors thick, but Decoll-
on clearer, 68. The cause ibid.
Infusions in Air, 5. The several odors issue
at several times ibid.
Infusion in Earth, 83, 84. The effects of it,
ibid. Caution to be used in it, ibid. Se-
veral instances thereof ibid.
Infusion or Inconceffion 179
Injunctns upon Fruits 168
India, 143. The name communicated to all
Creatures, bred of Purification, ibid.
The difference of them according to the
several matters they be bred of, 143,
144, 145. The enumeration of many of
them, ibid. Several properties in them,
ithe. They have voluntary motion, ibid.
Other Species, before Tafle ibid.
Invertible in Bodies ought to be better inqui-
red 26
Jovinians the Emperor 202
Joy, 150. The impressions thereof
ibid. Joys in some Plants, 121. The cause thereof
ibid.
Liquors clarified 2
Iron Instruments, bartful for wounds 166
Indurres Bodies 85
by growing out of a Stage Crown 115
Juices of Fruit fit for Drinks, 176. use
for them, ibid. The cause of each ibid.

L.

Làdonum 128
Lord put to waste, taketh away Wars 213
Lattitude 154
Lifting Trees and Herbs, 120. Designation
to make Plants more lifting then ordina
ry ibid.
Late Flowers and Plants 119
Lamning, 151, 152. The impressions there
of ibid.
Leasing long upon any part 154, 155
Leaping, 145. Helped by weights in the
hands ibid.
Leaves nourish not, 12. The cause 130.
Leaves of Trees and Herbs 127. Plant
without Leaves 192
Left-side and Right, 190. Sensest alike, strong
on each side, Limbs strongest on the Right
ibid. The cause of each ibid.
Left eye, by what causes prolonged 64
Lightes over-greate offend the eyes 188, 189
Light comforteth the Spirits, 211. Espe
cially Light varied ibid.
Lincolns 132
Liquors asbile, and not Liquefiable, 180. Bodies
that Liquefe by Fire, ibid. Others that
by water, ibid. Some what by both ibid.
Liquors, their Clarification, 67. Three
causethereof, ibid. 68. Preparation of
Liquors in Wells or Vats, 85. Liquors
expressed, 187. Their incorporation with
Powers 65
Living Creatures that generate at certain
seasons only, 150. Others that at all
seasons, ibid. The cause of each ibid.
Their
M.

Magical operations 128, 200, 204

Male 13

Male and Female, the difference of them 15
in several living creatures, 64. The causes thereof, ibid. 185. Male and Female in Plants, 126. Male-peonij, good for the Falling sickness and Inebity 209

Malevolent, 192. Pratified in Gal-

cony ibid.

Malt, 123. The swelling thereof, ibid.
The meawes thereof ibid.

Mansi-staf eaten, 6. Breedeth the French

Disease, ibid. Caufeth high imagina-
tions, ibid. Not in it self edible, 186.
The cause, ibid. How eaten by Cannibals, ibid. Wherefore by Pitchers ibid.

Mandragore 128

Manna 165

March, towards the end, the best discoverer of Summer sicknisses 173

Marl, a good Compost 122, 123

Murrow 157, 158

Maturaton, 179. Of Drinks, 69, 70. Of

Fruits, ibid. Maturaton of Digestion,

71, 73

Meats inducing satiety 66

Medicines changed helpful, 18. Medicines which effect the Bladder, 25. Medicines condening, which relieve the Spirits, 155. Medicinal herbs 104, 105

Megrims come upon rising, not during the

fitting 154

Melancholically persons dispase the company to the

lake 26

Melioration of Fruits, Trees, and Plants, 93, 94, 95, 96, 97, 98, 99, 100

Mel-cocotnes grow heat without grafting, 97. The cause thereof ibid.

Memory the Art, 207. Men, better places

then words, ibid. Memory strengthened by

the Brains of some creaturs 210

Menstruus women 202

Mercurial and Sulphurous 78

Metals and Plants wherein they differ, 126.

Growing of metals, 168. Drawing of

metals, ibid. 169. Refining of metals, 183. Metalline Vapors hurtful to the

Brain, 202. Metals give orient colours in their dissolutions, 64. The causes ibid.

Milk, warm from the Cow, a great nouris-

her, 14. How to be used, ibid. Cows Milk

better then Aifes Milk, or then womens

Milk, ibid. Milk in Beasts, how to be in-
creased, 164. Milk used for Clarification of Liquors, 69. Good to steep divers Seeds

in, 98. Preserving of Milk, 85. Milk in Plants 131

Mildew 104, 136

Minced meat, a great nourisher, 14. How to

be used ibid.

Mistletoe 116

Mixture of Earth and water in Plants 79

Moist Air, how discovered 173

Moisture adventitious, cause of putrefaction,

68. Moisture qualifying heat, the effect,

140. Moisture increased by the Moon,

193. Tryal of it in Seeds, ibid. In mens

bodies, ibid. Force of it in Vegetables

103, 104

Mothers 160

Moon attractive of heat out of Bodies 20

Moones influence, 192, 193, 194. In num-

ber four, ibid. It increaseth moisture ibid.

Morus Diaboli, an Herb 134

Mortified parts by cold, 166. Must not ap-

proach the fire, ibid. Cured, by applying

Snow, ibid. Or warm water 104.

Muf, 75, 113. Where it grows most, ibid.
The cause of it, ibid. What it is, ibid.

Muf's sweet, 114. In Apple-trees sweet,

ibid. In some other Trees 132

Mother suppressed by burning Feathers 204.

Mushers diet effeceth the Infant in the

womb 210

Motion bindreth putrefactions 75

Motion of Bodies, 161. Motion of Liberty 3

Motion of Next, 192. Motion of Consent in

muns body, 10, 17. Motion of Attrallion

would prevail if Motion of Gravity Bin-
dred not 148

Motions in men by imitation 65

Moulding of Fruits 108

Moulds 75

Mountains great foresew Tempests early

174

Mouse out of taste, 141. What tastes it will

not have ibid.

Mulberry-leaf 161

Mummy's flesheth Blood 210

Murthred body, bleeding at the approach of

the murtherer 207

Muscovia
## A Table of the chief Matters

| Muscovia hath a Late Spring, and early Harvest, | ibid. |
| Mushrooms, | ibid. |
| Their proprieties, | ibid. |
| Several productions of them, | ibid. |
| where they grow most | 131 |
| Musicke, | 29. Musical and immusical sounds, ibid. |
| Bodies producing Musical sounds, ibid. | 30. Distinction of the sweetest sounds, ibid. |
| Fee of Half-notes necessary in Music, ibid. | Consonant of Notes to be prescribed to the Anto-notes, not Entire Notes, 30. Concordant Perfect, and semi-perfect, which they are, ibid. |
| The most odious Discords of all other, ibid. | Discords of the Best, most disturbeth the Musicke, ibid. 31. No Quarter-notes in Musick, ibid. Pleasing of single Tones, answr. to the pleasing of Colour, and of Harmony to the pleasing of Order, ibid. |
| Figures or Tropes in Musicke have an agreement with the Figures in Rhetorick, ibid. | Musicke hath great operation upon the manners and spirits of Men, ibid. 31, 32. Concordances and Discords in Musicke, are Sympathies and Antipathies of Sounds, 61. Infrumenta that agree best in Concord, ibid. Infrumenta with a double Lay of Strings, Wire, and Lute-string. |
| N. | 62 |

### Nature, 62. Advice for the true Inquisition thereof | ibid. 64 |
| Natural Divination | 172 |
| Regroes | 88 |
| Night-floweres better for Fruit, then Day floweres | 135, 136 |
| Night Star-light, or Moon-shine, colder then cloudy | 188 |
| Nius, the virtues thereof, 161. How to clarify the water of it | ibid. |
| Nourishing Meats and Drinks | 121, 13 |
| Nourishing parts in Plants | 141, 130 |
| Nourishment, 14. Five several Means to help it | ibid. 155, 16 |
| Nourishment mend'd, a great help | 95 |
| Nuns two Cousins | 163 |

### P. | 17 |

#### Palliation in Diseases
| Pain and grief, 150. The impressions thereof | ibid. |
| Paintings of the Body, 155. Barbarous people much given to it | 156, ibid. |
| Panicum | 95 |
| Pantomimia | 56 |
| Paper chamsoletted | 356 |
| Patellar's Principles | 78, 79 |
| Parents finding an alteration upon the approach of their children, through unknown to them | 204 |
| Parts in living creatures easily repairable, and parts hardly repairable, 16. Parts of living creatures fevered, 216. Their virtues in Natural Magick | ibid. |
| Passions of the mind, 150, 151, 152. Their several impressions | ibid. |
| Peaches prove best without grafting, 97. The cause thereof | ibid. 110 |
| Pearl, said to recover the colour by burial in the Earth | 84 |
| Pepper | 50. |
contained in these Centuries.

Perception in all beds, 171. More subtle than the senses, ibid. It works also at distances, ibid. The best means of propagating, ibid. 172.

Perception, inward and outward, 1, 2.

Perception and impulsion of bodies, 160, 161.

Perfumes, Dryers, and Perfumes, Masnaries of the Brain, 201. Perfumes procure pleasant and prophetical Dreams, 204.

Perfons near in blood, or other Relations, have many secret passages of sympathy, ibid. 171.

Persian years, 85. Their Prognostick, 155, 172, 173.

Philosophy received, 178.

Pilgrimage in Men and Beasts, 139. The causes thereof, ibid.

Pileseach, 13.

Pit above the Set-shore, 1. Filled with water porabole, ibid. Practised in Alexandria, ibid. And by Cebes, ibid., who wished the cause, ibid. Intermine will become Salthe again, 191.

Pity, 157. The impression thereof, ibid.

Pius Quintus his resolution, touching the victory at Lepanto, 212.

Plague transmitted without sent, 200, 201. The supposed sent of it, ibid. Person lost apt to take it, and persons mild, ibid. Plagues caused by great purifications, 202. Preservatives against it, 209.

Plant-tree watered with wine, 118.


Plants drawing the same juices out of the earth, thrive not together, 101. Drawers of much nourishment, but their neighbor-plants, ibid. Drawing several juices, thrive well together, 102. Several influences of each, ibid. Designations of further tryals hereof, ibid.


Plants with roots or runcisses in the stalks, 121. The causes thereof, ibid. Differences of Plants, ibid. 122. Some putting forth blossoms before leaves, 121. Others, leaves before blossoms, ibid. The cause of each, ibid. Plants green all winter, 121, 122. The cause, ibid. Plants not supporting themselves, ibid. The cause of their Slanderers, ibid. Plants and inanimate bodies differ in four things, 125, 126. Plants and Metals in three, ibid. Plants and Moulds, or Putrefactions, wherein the dye, ibid. Plants and living Creatures their differences, 126, 127. Male and Female in Plants, ibid. Plants thereof Garments are made, 128. Plant steeping, ibid. Plants with bearded Roots, ibid. Plants efficient, 129, 130. Esculent raw, ibid. Having passed the fire, ibid. Parts in Plants are nourishing, ibid. Seeds in Plants, more strong then either Leaf or Root, ibid. The cause, ibid. In some not, ibid. Plants with Milk in them, 131. Plants with red juice, 132. No Plants have a salt taste, ibid. Plants with curled Leaves, 133. Plants may be translated into other Regions, 134. Yet they like some soils, more then other, ibid. Several influences thereof, ibid. Plants without leaves, 162. Singularities in several Plants, 138.

Plater hardened like Antler, 165.

Plaster'd room green, dangerous, 202.

Places of Metals offal, swelling, 187.

Pleasures and displeasures of the Senses, 145.

Plough followed, healthful, 103.

Pleasure in Birds, 139. The cause thereof, ibid.

Plums of what colour the best, 109. The dryer, the better sort, ibid.

Plumariales in Bodies, 181.

Poisoners, 363.

Pont-Charcenon, the Echo there, 37.

Porc-blinde men see best near hard, 188. The cause, ibid.

Potaed roots, greater, 92.

Powder in Skin, 3.

Powders and Lignors, their Incorporation, 65.
### A Table of the chief Matters

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poisoning of air</td>
<td>201</td>
</tr>
<tr>
<td>Poisoning by smells, ibid.</td>
<td>202</td>
</tr>
<tr>
<td>Caution touching poisoning</td>
<td>ibd.</td>
</tr>
<tr>
<td>Poisonous Creatures love to lie under Ode-</td>
<td>138</td>
</tr>
<tr>
<td>rate Herbs</td>
<td></td>
</tr>
<tr>
<td>Precious plants comfort the spirits</td>
<td>208</td>
</tr>
<tr>
<td>Preservation of bodies from corruption</td>
<td>28</td>
</tr>
<tr>
<td>Preservation of Fruits in Sirups, 129.</td>
<td></td>
</tr>
<tr>
<td>Also in powders, ibid.</td>
<td>When to gather fruits for preservation, ibid.</td>
</tr>
<tr>
<td>Also in Bottles in a well, ib.</td>
<td>Prefering Grapes long, ib.</td>
</tr>
<tr>
<td>Another way thereof</td>
<td>134</td>
</tr>
<tr>
<td>Prickles of Trees</td>
<td>116, 117</td>
</tr>
<tr>
<td>Procreation by copulation, and by putrefa-</td>
<td>194</td>
</tr>
<tr>
<td>tion, ibid.</td>
<td></td>
</tr>
<tr>
<td>The cause of each</td>
<td>ibid.</td>
</tr>
<tr>
<td>Proprieties for plenty or scarcity.</td>
<td>158.</td>
</tr>
<tr>
<td>Of pestilential years, 141. 155, 157, 175.</td>
<td></td>
</tr>
<tr>
<td>Proprieties secret</td>
<td>117, 214</td>
</tr>
<tr>
<td>Purging Medicines, 5. Have their virtue in a hot spirit.</td>
<td>Endure not boiling, ibid.</td>
</tr>
<tr>
<td>Taking away their unpleasant taste, ibid.</td>
<td>Several ways of the operations of purging Medicine, 10, 11, 12. They work upon their proper Humors, 11. Medicines that purge by poison, and that purge by winter, 12. Their several causes, ibid. Work in these ways as they are given in quantity, ib. Preparations before purging, 11. Want of preparatives, what hurt it doth, both in purging, ibid, and after purging</td>
</tr>
<tr>
<td>Purification, 75. Acceleration of it, ibid.</td>
<td>The cause of purifaction, ibid. Purifica-</td>
</tr>
<tr>
<td>tion, however, 74. Ten means of inducing</td>
<td>Prohibiting of purifaction, 75. Ten means of prohibi-</td>
</tr>
<tr>
<td>ting it, ibid. 76. Inceptions of purifi-</td>
<td>cation, 75.</td>
</tr>
<tr>
<td>cation,</td>
<td>Prefe. Plant for the most part small ill, 177. The cause, ibid.</td>
</tr>
<tr>
<td>Purification from what causeth it cometh, 178. Purification induced by the</td>
<td>Moor-beans</td>
</tr>
<tr>
<td>Purification of living creatures, have</td>
<td>192</td>
</tr>
<tr>
<td>caused Plagues</td>
<td>102</td>
</tr>
<tr>
<td>Purified bodies most odious to a creature of</td>
<td>the same kinds</td>
</tr>
<tr>
<td>Psittaco's bit Philosophy</td>
<td>158</td>
</tr>
<tr>
<td>of the same kind</td>
<td>ibid.</td>
</tr>
<tr>
<td>Psittaco had his teeth undivided</td>
<td>197</td>
</tr>
<tr>
<td>Proprietaries that grow hard</td>
<td>18</td>
</tr>
<tr>
<td>Quick-silver will conserve Bodies</td>
<td>168</td>
</tr>
<tr>
<td>Quick-silver fixed to the hardness of Lead</td>
<td>182</td>
</tr>
</tbody>
</table>

### R.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaking of Wine or Beer</td>
<td>68</td>
</tr>
<tr>
<td>Rain in Egypt scarce, 161. The cause thereof, ibid. Several prophecies of Rain</td>
<td>175, 176</td>
</tr>
<tr>
<td>Rainbow said to bring sweetness of odor to Plants under it</td>
<td>176, 177</td>
</tr>
<tr>
<td>Rams skins good to be applied to wounds</td>
<td>139</td>
</tr>
<tr>
<td>Red within some few Fruits</td>
<td>109</td>
</tr>
<tr>
<td>Red juice in Plants</td>
<td>132</td>
</tr>
<tr>
<td>Reeds</td>
<td>143</td>
</tr>
<tr>
<td>Refining of Metals</td>
<td>183</td>
</tr>
<tr>
<td>Refraction cansteth the species visible to appear bigger, 160. Other observations about Refractions</td>
<td>ibid.</td>
</tr>
<tr>
<td>Reflection hindeth Generation</td>
<td>94</td>
</tr>
<tr>
<td>Reft cansteth Putrefaction</td>
<td>75</td>
</tr>
<tr>
<td>Retardation of Germination</td>
<td>92</td>
</tr>
<tr>
<td>Root helpeth the Fig-tree</td>
<td>102</td>
</tr>
<tr>
<td>Rheumes, how caused</td>
<td>11</td>
</tr>
<tr>
<td>Rice a nourishing meat</td>
<td>13</td>
</tr>
<tr>
<td>Right side and left, 190. Sense alake strong on both sides. Limbs strongest on the Right, ibid. The cause of each</td>
<td>ibid.</td>
</tr>
<tr>
<td>Rooms built for health</td>
<td>20</td>
</tr>
<tr>
<td>Roots of fruit trees multiplied, 93, 94.</td>
<td>Root made great, 95. By applying Panic-</td>
</tr>
<tr>
<td>um about it, ibid. Roots potted, grew greater, 99, 100. Roots preserved all winter, ibid. Roots of Trees that defend deep, 132, 134. Others that spred more, ibid. The cause of each, ibid. Roots of Plants of three sorts, Bullock, Fibrus, Hirfute</td>
<td>123</td>
</tr>
<tr>
<td>Rota Solis the Herb</td>
<td>104</td>
</tr>
<tr>
<td>Rofet Damask how conservd</td>
<td>81</td>
</tr>
<tr>
<td>Rubarb infused, 4, 5. For a short time beast</td>
<td>ibid.</td>
</tr>
<tr>
<td>Repeated may be as strong as Com-</td>
<td>mony, ibid.</td>
</tr>
<tr>
<td>mony. A Benedet Medicine, 5. Caution in the taking thereof</td>
<td>11</td>
</tr>
<tr>
<td>Root of Metals</td>
<td>74</td>
</tr>
</tbody>
</table>

### S.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sali-</td>
<td>66</td>
</tr>
<tr>
<td>Salmah, 165, 167. The cause that it endureth the fire</td>
<td>ibid.</td>
</tr>
<tr>
<td>Salt a good Compost, 133. Salt in Plants, 132.</td>
<td>Salt</td>
</tr>
</tbody>
</table>
Salt hath a sympathy with Blood. 211. It is an healer, ibid. It riseth not in Distillations 190, 191
Salt-petre, bow it may be bred 127
Salt-water peoted through Earth, becomes fresh; 3. Four differences between the post- ing it in Fists and in Pits, 2. Salt-water good for to water some herbs, 137, 138. Salt-water boiled, becomes more potable, 190, 191. Salt-water soon disfiguring Salt, then Fresh-water, ibid. The cause ibid.
Sand turning Minerals into a Glasy Sub- stance 164
Sanguis Draconis, the Tree that bears is 132
Sap of Trees, 134. The differing nature thereof in several Trees ibid. Scarlet dye 191, 192
Scissible, and not scissible 182
Sea clearer the North wind blowing then the South, 139. Sea, by the bubbles fore- stomach wind, 175. Sea-water looketh black, moved; while, resting, 139. The cause, ibid. Sea shallow and narrow, break more then deep and large 190
Sea-fish put into Fresh-waters 147
Sea-bare coming near the Body, hurteth the Lungs 211
Sea-fand a good Compost, 123. Sea-sands produce no Plant 118
Seasons of Plants 119
Secret proprieties 214, 215
Seasoning 154
Seeds in Plants, more strong then either Leaf or Root, 110. The cause, ibid. In some not, ibid. Seeds, their choice, 157. Plants growing without Seeds 117, 118
Senses, their pleasurable and displeasurable, 145. Their instruments have a similitude with that which giveth the reflection of the object 62
Separation of several Natures by straining, 2. Of several Liquors by weight, 2. And of the same kinds of Liquors thickened, 4. Of Metals 169
Separation of the cruder parts prohibited by Putrefaction 76
Serrets used in Turkey 148
Sitting of Wheat 93, 96
Setting of Trees, higher or lower 99
Several Fruits upon one Tree 147
Shade helpeth some Plants 95
Shadows seeming ever to tremble 190
Shame, 154, 206. The impression thereof 151
Shell-fish have no Bones within 157, 189, 190
Shifting for the better, helpeth Plants and Living Creatures 95
Shining wood 77, 78
Showes good for fruits, 125. For some not, ibid. Night-showers better then Day-showers 148
Showers after a long drought, cause Sicknisses if they be gentle, 172. If great, not ibid.
Sicknisses of the Summer and the Winter 84
Sight the object thereof, quicker then of Hearing. 50, 51, Sight, 188, 189. Objects thereof, cause great delight in the Spirits, but no great offence, ibid. The cause ibid.
Silver more easily made then Gold 71, 72
Simplest special for Medicines, 141, 142. Such as have subtle parts without Acrimony, ibid. Many creatures bred of Putrefaction, are so, ibid. Also Putrefactions of Plants ibid.
Singularities in several Plants 138
Sinking of Bodies, 163. The cause ibid.
Sitting healthful 154
Skull 157
Sleep agree them no longer, 15. Sleep, 156, 157.

....

Smells and Odors, 86. Breast at some distance, ibid. Breast where the Body is crustated, ibid. Noise in flowers crustated, ibid. Breast in Flowers, while Leaves smell not, ibid. Smells sweet, 177. Have all a corporal substance, ibid. Smells fatide, ibid. 178. Smell of the feet most pungent, 201. Smells that are most dangerous, ibid.
Snake-skin worn 209
Snowing causeth the Hiccough, 104. Induced by looking against the Sun, ibid. The cause thereof ibid.
Snow-watter, 87. Snows cause fruitfulness, ibid. Three causes thereof, ibid. Snow good to be appli ed to a mortified part, 156. The cause thereof, ibid. Snow bringing forth Herbs 118
Soil of the Earth, have a sympathy with the Head 25
Soft Bodies, 181. The cause, ibid. They are of two sorts ibid.
Solid Bodies sweating fore and after Rain, 176
Soot a good Compost 123
Sore, 137. The Root thereof ibid.
Soul of the World 197, 198
Sounds Magical and Immungual 29
Sounds more apt to procure sleep then tones, 71. The cause, ibid. Nature of Sounds, not sufficiently inspired, 32. Motions great in Nature without Sounds, ibid.
X
Nullity
A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds

A Table of the chief Matters

Communication of Sounds

Inequality of Sounds, 41
Unequal Sounds
The cause thereof, ibid. Mixture without
distinction, makes the best influence, ibid. Qualities in the Air, have no operations
upon Sounds, ibid. Sounds in the Air
alter one another, 54. Two Sounds of like
sounds, will not be heard as far again as
one, ibid. The cause thereof
ibid. 

A felon of Sounds, 53. Polished Bodies,
created Sounds nullate them, ibid. wet
on the inside of a Pipe doth the like, ibid. Easily weather causeth the same, ibid.
Mollifying of open Air with pent Air, doth
the same, ibid. From a body equal, sound
better, 55. Intention of the Sense of
Hearing, molliate them
ibid. 

Imitation of Sounds, ibid. The wonder of
thereof in Children and Birds
ibid. 

A felon of Sounds, 56. The several kindes,
ibid. No reflation in Sounds observed, 58. Sympathy and antipathy of Sounds, 61.
Concerts and Diffords in Music are
sympathies and antipathies of Sounds, ibid. Strings that best agree in Concert, ibid. Strings tuned to one Ratio or a Diapason,
show a Sympathy, 62. Sympathy conceived,
to cause no report, ibid. Experiment of
Sympathy to be transferred to Wind-Instru-
mens
ibid. 

Essence of Sounds Spiritual, 63. Sounds not
impression in the Air
ibid. 

Causer of the quickened Generation and Peri-
ishing of Sounds
ibid. 

Expiration touching Sounds
63. 

Sources of Fruits and Liquors, 187. The
case of each, ibid. Souring of Liquors
in the Sun
ibid. 

South-winds dispose Men Bodies to heavi-
ness, 64. South-winds burn to Fruit
blossominy, 135. South-winds without
Rain, breed Pollens, with Rain not, 166. The causes, ibid. On the sea-coasts
not so
ibid. 

South-East, Sun better then the South-west
for ripening Fruits
ibid. 

Sparkling woods
133. 

Species visible
160. 

Spirits in Bodies, scarce known, 56. Seve-
real opinions of them, ibid. They are Na-
tural Bodies rarified, ibid. Causes of
most of the effects in Nature, ibid. They
have fixed Spring operations, 71. Spirits
in Bodies, 125. How they differ in animate
and inanimate, ibid. How in Plants and
Living Creatures
126. 

Again of Spirits in Bodies, 181. They are
of two sorts, ibid. Motion of the Spirits
excited by the Moon, 103. The strengthening
of them prohibite Parafallion
76. 

Spirits of Men are upon Adam's offireit, 107.
The Transformation of Spirits, 149. In
subtility, Transformation of them from the
mind of Man, 163, 274, 390, 27, 394, 200.
Such things as comfort the Spirit,
by sympathy, 203, 209. The strike of the
Spirits, best helped by arresting them for a
time
111. 

Sponges
147. 

Springs of water made by act
6. 

Spring-water
57. 

Sprouting of Plants with water only
133. 

Spicy good to set Kerneals or Plum-flow-
in
96. 

Stags that with a Beeze
157. 

Stancher of Blood
210. 

Stars better observed, a sign of Tempests
174. 

Sterility of the Year, change the Corn into an-
other kind
111. 

Stomach, the appetite thereof, 176. The
quantities that provoke appetite, ibid. The
four cases of appetite
ibid. 

Stone wanting in Plants
110. 

Stretching, a motion of imitation
65. 

Sublunary Fires
78. 

Sucking long, all for Children
113. 

Sugar, 127, 133. The use of it, ibid. Draweth Liquor, higher then the Liquor
cometh
21. 

Sulphurous and Mercurial
78, 79. 

Summer and winter sicknes, 84. The Prog-
incials of a dry Summer
174. 

Sun Tanneth, which Fire doth not, 87, 88.
The case
ibid. 

Supererogation, the case of it
116. 

Super-Plants beside Mel一趟
135. 

Supporting Plants of themselves, and not
supporters
122. 

Swallows made white, by anointing the Eggs
with Oyl
211. 

Swat, 148. Part under the water, though
hot swat not, ibid. Salt in taste, ibid. Cometh more from the upper parts then
from the lower, ibid. More in steep then
making, ibid. Cold sweat commonly mor-
tal, ibid. 149. Sweat, in what diseases
good, in what bad, ibid. In some men
have been fainted
2. 

Sweet Mosi, 114, 132. Sweetness of odor
from the Rain, 176. Sweetness of odor,
whether not in Somwater, ibid. In
Earth sound, ibid. Sweet smell, 177. Se-
veral properties of them, ibid. They
have Corporeal substances
ibid. 

Sweetness in Fruits and Liquors, 187. The
cause
x 2.
A Table of the chief Matters

cause of each, ibid. Sweet things commixed, prohibitory Partnership, 76
Swelling, how caused in the Body, 74. How it may be kept down, 187. why it followeth upon Blows and Bruises, ibid.
Swelling of Grains upon Boiling, 185. The cause of the different swelling them ibid.
Swimming of Bodies, 163, 166, 167. The cause
Swines Dung dulcereateth Fruit, 98. The cause ibid.
Svinging of Bottles, 68. The use of it ibid.
Swoundings 203
Sylva Sylvanum, the intention of it 24, 25
Sympathy and Antipathy, 25. Sympathy in Plants, 98. Sympathy and Antipathy of Plants 101, 102, 103, 104
Sympathy, 211. Influences thereof ibid, 208, 209. Sympathy, secret between Persons, near in blood, 212. Between great friends in absence, ibid. Sympathy between Multitudes, ibid. Sympathy of Individuals 213

T

Ears of Trees 128
Teeth, 141, 157. Their tendereness, 128.
Teeth set on edge by harsh sounds, 145. The cause, ibid. Sirens in them, the cause of their pain, not the arrow, 158, 159.
Their several kinds, ibid. Difference in several Creatures, ibid. Horned beasts have no upper teeth, ibid. Tooth, the mark of horses age, ibid. At what age they come forth in Men, ibid. What things hurt them, ibid. Chiefest considerations about the Teeth, 158. Restoration of Teeth in age, ibid. Whether it may be done or no ibid.
Temple, their predictions 174
Temple bodies 181, 182
Terra Lemnia 147
Terra Siggillata communis ibid.
Thales 138
Thistle down flying in the Air, foreswemth wind 175
Timber, 134. The several nature of them, ibid. The several uses according to the nature of the Trees 135
Time and heat work the like effects, 65. Their different operations in many things, ibid.
Toad foot 115
Tobacco, 185, 207. English Tobacco, how it may be mended 185
Trees noiser yield less Moss, 114. The cause
ibid.
Trees in Clay-grounds apt to gather Moss,
ibid. The cause
ibid.
Trees side-bound bring forth Moss,
ibid. Those trees that stand longest, 118, vic. The largest of
bodies, ibid. Such as bring forth Moss or Nuts,
ibid. Such as bring forth Leaves late,
and fled them late, ibid. Such are often cut
ibid.
Trees with scattered boughs, 121. With up-
right boughs, ibid. The cause of each
ibid.
Tree Indian with Leaves of great largeness,
and Fruit without stalks 127
Tree in Persia nourished with Salt-water
ibid. 128
Trees commonly fruitful, but each other
year 110
Trees bearing best on the lower boughs, 111.
other on the higher boughs, ibid. The
cause of each, ibid. Such a bear best when
they are old, 111. Others when they are
young, ibid. The cause of each
ibid.
Trembling in Bedows 190
Trees for wholesome Air 164
Taste of Moss on a Briar-bush
ibid. 117
Tufts great, &c. 156. To them, Bathing
good ibid.
Twice, a year Fruits 119
Tying of the Point 192, 193
Tyranny over Men's Understandings and Be-
liefs much afflicted

V.

Vapors of Charcoal, or of Sea coal, or of
a Room newly plastered, mortal
ibid.
Vapors which taken outwardly, would con-
dense the Spirits
ibid. 203
Vegetables rotting upon the ground, a good
Compst 223. Several influences thereof
ibid.

Vejus
ibid.

Venus Bodies 180
Veni, 142. It excesses dimethet the sight, ibid.
The Act of it. After more inclined in
Winter, women in Summer
ibid. 143
Vermines frighted with the Head of a Vooof
ibid. 210
Veszuvius 155

Vines made fruitful by applying the Kernels
of Grapes to the Roots, 10. The cause
thereof, ibid. Made to sprout suddenly
with Nitre, 96. Live not the Colewort,
ibid. Vines-Trees, 128, 125. Anciently
of great bodies, ibid. A tough wood dry,
ibid. Vines in some places, not propped
ibid. 125

Vine-great upon Vine 150
Vinegar 194
Violet Vinegar
W.

Wher, a special means to make
ground fruitful
ibid. 123, 124
Warts taken away by Lord or an Elder-stick
ibid. 213

Water thickened in a Cave, 20. Changed
suddenly into Air, 24. Choice of waters,
86. By weight, ibid. By boiling, ibid. By
longest lasting, imputresced, ibid. By
making Drinks stronger, ibid. By bearing
Soup, ibid. By the places where they are
congregated, 87. By the Soil, ibid. Wa-
ters sweet, not to be trusted, ibid. Wat-
ters, ibid. Water puteth forth Herbs
without Roots, 127. Water alone will
cause Plants to sprout, ibid. Well-water
warmer in Winter then in Summer, 191.
Water rising in a Bifon by means of Flames
ibid. 192

Water hot, and Fire, heat differently, 124.
Water
A Table of the chief Matters

Water cooleth Air, and moisteneth it not

Water may be the Vuild of Sound, 187, 188

Water moisture endareth Putrefaction, 251


Water-Cress 78

Weight of the Solution of Iron in Aqua-fortis 166

White seed 95, 96


White Gunpowder 42, 43

White faces, 164. Tryal for them, 173.

Moist Air, not good, ibid. Inequality of Air, naught ibid. White faces, why water will not quench them 165

Wild Herbs show the nature of the Ground

Winds Southern, dispose Mens bodies to heaviness, 81. Winds Southern without Rain feared 166

Winds gathered for freshness, 164. Prognosticks of winds 174

Winding Trees 113

Wine burnt, 5. Wine how to be used in Consumptions, 14. Wine, for what Bodies good, for what hurtful, 153. Wine corrected, that it may not flame 165

Wine new, pretently made poatable 139

Wine and water, separated by weights, 3, 4. Tryal hereof in two Glasses, ibid. When it will operate, and when not, ibid. Spirit of wine burnt, 132. Mangled with wax, the operation of it ibid.

Winter and Summer; 133, 84. Signs of a cold winter, 133, 174. Winter Sleepers 104

Witches, 198, 109. Work most by Imagination and Faezy, ibid. 203. Witches Ointment 210

Woof-guts applied to the belly, cure the Colicke, ibid. Head hanged up frighteth Vermic ibid.

Wonder, 151. The Impressions thereof ibid.

Wood shining in the dark 77, 78

Wood-scar 104

Wood attractive of Water, 20, 25. Through a Veisel world, supposed by some to be a Living Creature 157, 158

Worms foretell Rain 176

Wounds, some applications to them, 139

Wounds made with Brass, easier to cure than those made with Iron 166

Wristes have a sympathy with the Head, and other parts 25

Y.

Yawning bindeth Hearing, 62. The cause, ibid. It is a motion of imitation, 65. In yawning, dangerous to pick the Ear 149

 Tears sterile, cause Corn to degenerate 111

Yellow colour in Herbs 109

Young Trees, which bear best 131

Z.

One Torrid, left tolerable for Heats then the Aequinoctial, 87. Three causes thereof ibid.
His Lordships usual Receipt for the Gout (to which, the Sixtieth Experiment hath reference) was this.

To be taken in this order.

1. The Poultice.
   Of Manchet, about three Ounces, the Crum onely, thin cut; let it be boiled in Milk till it grow to a Pulp; add in the end, a Dram and a half of the Powder of Red Roses.
   Of Saffron ten Grains.
   Of Oyl of Roses an Ounce.
   Let it be spread upon a Linnen Cloth, and applied luke-warm, and continued for three hours space.

2. The Bath or Fomentation.
   Of Sage-Leaves, half an handful.
   Of the Root of Hemlock sliced, six Drams.
   Of Briony Roots, half an Ounce.
   Of the Leaves of Red Roses, two Pugils.
   Let them be boiled in a Pottle of Water wherein Steel hath been quenched, till the Liquor come to a Quart; after the straining, put in half an handful of Bay-Salt.
   Let it be used with Scarlet-Cloth, or Scarlet-Wool, dipped in the Liquor hot, and so renewed seven times; all in the space of a quarter of an hour or little more.

3. The Plaister.
   Emplastrum Diascalcithos, as much as is sufficient for the part you mean to cover; let it be dissolved with Oyl of Roses in such a consistence as will stick, and spread upon a piece of Holland, and applied.

FINIS.
ARTICLES OF ENQUIRY, TOUCHING METALS & MINERALS.

Written by the Right Honorable, FRANCIS BACON, BARON of VERULAM, Viscount St. Alban.

Thought fit to be added, to this WORK OF HIS NATURAL HISTORY. Nevly put forth in the Year, 1661. By the former Publisher.

LONDON, Printed for William Lee at the Turks-head in Fleetstreet. 1669.
ARTICLES OF ENQUIRY, TOUCHING METALS & MINERALS.

He first Letter of the Alphabet is, the Compounding, Incorporating, or Union, of Metals or Minerals.

With what Metals, Gold will incorporate, by Simple Colliquefeactions, and with what not? And in what quantity it will incorporate? and what kinde of Body the Compound makes?

Gold with Silver, which was the ancient Electrum.
Gold with Quick-silver.
Gold with Lead.
Gold with Copper.
Gold with Brals.
Gold with Iron.
Gold with Tin.

So likewise of Silver.

Silver with Quick-silver.
Silver with Lead.
Silver with Copper.
Silver with Brals.
Silver with Iron.
Silver with Tin.
So likewise of Quick-silver.
Quick-silver with Lead.
Quick-silver with Copper.
Quick-silver with Brass.
Quick-silver with Iron.
Quick-silver with Tin.

So of Lead.
Lead with Copper.
Lead with Brass.
Lead with Iron.
Lead with Tin.

So of Copper.
Copper with Brass.
Copper with Iron.
Copper with Tin.

So of Brass.
Brass with Iron.
Brass with Tin.

So of Iron.
Iron with Tin.

What are the Compound Metals, which are common, and known? And what are the Proportions of their mixtures? As Lattin of Brass, and the Calaminar-stone.
Bell-metal of, &c.
The counterfeit Plate, which they call Alchumy.
The Decomposites of three Metals, or more, are too long to enquire, except there be some Compositions of them already observed.
It is also to be observed, Whether any two Metals which will not mingle of themselves, will mingle with the help of another; and what?

What Compounds will be made of Metal, with Stone, and other Fossiles? As Lattin is made with Brass, and the Calaminar-stone. As all the Metals with Vitriol: All with Iron powdered. All with Flint, &c.

Some few of these would be enquired of, to disclose the Nature of the rest.

Whether Metals, or other Fossiles, will incorporate with Molten Glass? And what Body it makes?
The quantity in the mixture would we well considered: For some small quantity, perhaps, would incorporate; as in the Alloys of Gold, and Silver Crown.

Upon the Compound Body, three things are chiefly to be observed. The Colour, the Fragility or Plianness, the Volatility or Fixation, compared with the Simple Bodies.

For present use or profit, this is the Rule. Consider the price of the two Simple Bodies; consider again the Dignity of the one above the other
other, in use. Then see, if you can make a compound that will save more in the price, then it will lose in the dignity of the use. As for example, Consider the price of Brass Ornaments; consider again the price of Iron Ornaments; and consider, wherein the Brass Ornaments doth exceed the Iron Ornaments in use. Then if you can make a Compound of Brass and Iron Ornaments, that will be near as good in use, and much cheaper in price, there is profit both to the private and to the Commonwealth.

So of Gold and Silver, the price is double of Twelve. The dignity of Gold above Silver is not much; the splendor is like, and more pleasing to some eye. As in Cloth of Silver, Silver Lace, silvered Rapiers, &c. The main dignity is, that Gold bears the Fire, which Silver doth not; but that is an excellency in Nature, but it is nothing at all in use. For any dignity in use, I know none, but that Silvering will fully and canker more than Gilding; which, if it may be corrected, with a little mixture of Gold, there is profit. And I do somewhat marvel, that the later ages have loft the ancient Eleum, which was a mixture of Silver with Gold; whereas, I conceive, there may be much use both in Coyal, Plate, and Gilding.

It is to be noted, that there is in the Verrion of Metals, impossibility, or at least great difficulty; as in making of Gold, Silver, Copper: On the other side, in the adulterating or counterfeiting of Metals there is deceit and villany; but it should seem there is a middle way, and that is, by new compounds, if the ways of incorporating were well known.

What Incorporation or Imbition, Metals will receive from Vegetables, without being dissolved might be inquired. As when the Armorers make their Steel more tough and plyam, by the aspersion of Water, or Juice of Herbs: When Gold being grown somewhat churlish by recovering, is made more plyant by throwing in shreds of Tanned Leather, or by Leather oyled.

Note, that in these, and the like shews of Imbition, it were good to try by the weight, whether the weight be increased, or no? For if it be not, it is to be doubted, that there is no Imbition of Substance; but only, that the Application of the other Body, doth dispose and invite the Metal to another posture of parts then of itself, it would have taken.

After the Incorporation of Metals, by simple Colliquafciion, for the better discovery of the Nature: And Confects and Diffents of Metals by incorporating of their Diffolutions, it would be enquired.

What Metals being dissolved by Strong-waters, will incorporate well together, and what not? which is to be inquired particularly, as it was in Colliquafciions.

There is to be observed in those Diffolutions, which will not incorporate what the effects are: As the Ebulition, the Precipitation to the bottom, the Ejaculation towards the top, the Suspension in the midft, and the like.

Note, that the Diffents of the Menstrua, or Strong-waters, may hinder the Incorporation, as well as the Diffents of the Metals themselves: Therefore where the Menstrua are the same, and yet the Incorporation followeth not, you may conclude, the Diffent is in the Metals, but where the Menstrua are several, not so certain.
The Second Letter of the Cross Row, is the Separation of Metals, and Minerals. Separation is of three sorts; the first is, The separating of the pure Metal from the Ure or Dros, which we call Refining. The second is, The drawing one Metal or Mineral out of another, which we may call Extracting. The third, The separating of any Metal into his Original or Elements, or call them what you will) which work we call Precipitation.

For Refining, we are to enquire of it according to the several Metals; As Gold, Silver, &c. Incidentally, we are to enquire of the first Stone, or Ure, or Spar, or Marcasite of Metals severally; and what kind of Bodies they are; and of the degrees of Richness.

Also, we are to enquire of the Means of separating, whether by Fire, parting Waters, or otherwise.

Also, for the manner of Refining, you are to see how you can multiply the Heat, or hasten the Opening; and to save charge, in the Refining.

The means of this is in three manners; that is to say, In the Blaff of the Fire: In the manner of the Furnace to multiply Heat, by Union and Reflection: And by some Additament or Medicines, which will help the Bodies to open them the sooner:

Note, the quickening of the Blaff, and the multiplying of the Heat in the Furnace, may be the fame for all Metals; but the Additaments must be several according to the natures of the Metals.

Note again, That if you think the multiplying of the Additament in the same Proportion that you multiply the Ure, the work will follow, you may be deceived: For quantity in the Passive will add more resisance, then the same quantity in the Active will add force.

For Extracting, you are to enquire what Metals contain others, and likewise what not? As Lead, Silver, Copper Silver, &c.

Note, although the charge of Extraction should exceed the worth, yet that is not the matter; For, at least, it will discover Nature and Possibility, the other may be thought on afterwards.

We are likewise to enquire, what the differences are of those Metals, which contain more or less, other Metals; and how that agrees with the poorness or richness of the Metals, or Ure, in themselves: As the Lead, that contains most Silver, is accounted to be more brittle; and yet otherwise poorer in itself.

For Principiation, I cannot affirm, whether there be any such thing, or no. And, I think, the Chymists make too much ado about it. But however it be, whether Solution or Extraction, or a kind of Conversion by the Fire, it is diligently to be enquired, What Salts, Sulphur, Vitriol, Mercurv, or the like Simple Bodies are to be found in the several Metals; and in what quantity.
The third Letter of the Cross-Row, is the variation of Metals into several Shapes, Bodies, or Natures; the particulars whereof follow.

Tincture.
Turning to Rust.
Calcination.
Sublimation.
Precipitation.
Amalgamating, or turning into a soft Body.
Vitrification.
Opening or Dissolving into Liquor.
Sprouting, or Branching, or Arborecence.
Induration and Mollification.
Making tough or brittle.
Volatility and Fixation.
Transmutation or Version.

For Tincture, it is to be enquired how Metals may be tinted, through and through; and with what, and into what colours: As Tin-ding, Silver yellow, Tin-ding, Copper white, and Tin-ding red, green, blew, especially with keeping the luftre.

Item, Tincture of Glass.
Item, Tincture of Marble, Flint, or other Stone.

For turning to Rust, two things are chiefly to be enquired: By what Corrosives it is done, and into what colours it turns: As Lead into white, which they call Serus; Iron into yellow, which they call Crocus Martis; Quick-silver into Vermilion, Bals into green, which they call Verdegas, &c.

For Calcination, to enquire how every Metal is calcined? And into what kind of Body? And what is the exquifitest way of Calcination?

For Sublimation, to enquire the manner of Subliming, and what Metals endure Subliming; and what Body the Sublimate makes?

For Precipitation likewise, By what strong Waters every Metal will precipitate? or with what Additaments? and in what time? and into what Body?

So for Amalgama, what Metals will endure it? What are the means to do it? And what is the manner of the Body?

For Vitrification likewise, what Metals will endure it? what are the means to do it? into what colour it turns? and further, where the whole Metal
Metal is turned into Glass? and when the Metal doth but hang in the Glassic part? allo what weight the vitrified Body bears, compared with the crude Body? Also because Vitrification is accounted, a kinde of death of Metals, what Vitrification will admit, of turning back again, and what not?

For Dissolution into Liquor, we are to enquire, what is the proper Menstrum to dissolve any Metal? And in the Negative, what will touch upon the one, and not upon the other? And what several Menstrua will dissolve any Metal? And which most exactly? Item, the process of motion of the Dissolution? The manner of Rising, Boiling, Vaporing? More violent or more gentle? Causing much heat, or less? Item, the quantity or charge the Strong-Water will bear, and then give over? Item, the colour into which the Liquor will turn? Above all, it is to be enquired, whether there be any Menstruum to dissolve any Metal that is not fretting and corroding; but openeth the Body by sympathy, and not by mordacity or violent penetration?

For Sprouting or Branching, though it be a thing but transitory, and a kinde of toy or pleasure; yet there is a more serious use of it: For that it discovers the delicate motions of spirits, when they put forth, and cannot get forth, like unto that which is in vegetables.

For Induration or Mollification, it is to be enquired, what will make Metals harder and harder, and what will make them softer and softer? And this Enquiry tendeth to two ends;

First, for Use: As to make Iron soft by the Fire, makes it malleable.

Secondly, Because Induration is a degree towards Fixation; and Mollification towards Volatility: And therefore the Inquiry of them, will give light towards the other.

For rough and brittle, they are much of the same kinde with the two former, but yet worthy of an Inquiry apart: Especially to joyn Hardness to Toughness; as making Glass malleable, &c. And making Blades, strong to resist, and pierce, and yet not easy to break.

For Volatility and Fixation, it is a principal Branch to be enquired. The utmost degree of Fixation is, That whereupon no Fire will work, nor Strong-water joyned with Fire, if there be any such Fixation possible: The next is, when Fire simply will not work without Strong-waters: The next is, when it will endure Fire not blown, or such a strength of Fire: The next is, when it will not endure Fire, but yet is malleable: The next is, when it is not malleable, but yet it is not fluent, but stupidized. So of Volatility, the utmost degree is, when it will flee away without returning: The next is, when it will flee up, but with ease return: The next, when it will flee upwards, over the Helm, by a kinde of Exultation, without Vaporing: The
The next is, when it will melt, though not rise; and the next, when it will boil, though not melt. Of all these, diligent inquiry is to be made, in several Metals; especially of the more extreme degrees.

For Transmutation or Version, if it be real and true, it is the furthest point of Art; and would be well distinguished from Extraction, from Restitution, and from Adulteration. I hear much of turning Iron into Copper; I hear also of the growth of Lead in weight, which cannot be without a Conversion of some Body into Lead: But whatsoever is of this kind, and well approved, is diligently to be inquired, and set down.

The fourth Letter of the Cross Row, is Restitution. First therefore, it is to be enquired in the Negative; what Bodies will never return, either by reason of their extreme fixing, as in some Vitrifications, or by extreme Volatility.

It is also to be enquired of the two Means of Reduction; and first by the Fire, which is but by Congregation of Homogeneal parts.

The second is, by drawing them down, by some Body, that hath consent with them: As Iron draweth down Copper in Water; Gold draweth Quick-silver in vapor; whatsoever is of this kind, is very diligently to be enquired.

Also it is to be enquired, what Time or Age will reduce without the help of Fire or Body?

Also it is to be enquired, what gives Impediment to Union or Restitution, which is sometimes called Mortification; as when Quick-silver is mortified with Turpentine, Spittle, or Butter.

Lastly, it is to be enquired how the Metal restored, differeth in any thing from the Metal raw or crude? As whether it becometh not more cheerful, altered in colour, or the like?
THE BOOKSELLER
unto the
READER.

Received some Moneths since these Articles of Enquiry, touching Metals and Minerals, from the hands of the Reverend Dr. Rawley, who hath published several of the Lord Verulams Works since his Death (he having been his Lordships Chaplain) and who hath been careful to correct at the Press this little Piece ('an Addition to the Natural History') according to the Original Copy, remaining amongst his Lordships Manuscripts. Amongst which there is nothing more of that subject to be found, so as no more Additions can be expected.

W. Lee.

FINIS.
HISTORY

Natural and Experimental
OF
LIFE & DEATH:
OR,
Of the Prolongation of LIFE.

Written in Latin by the Right Honorable
FRANCIS Lord Verulam,
Viscount St. Albans.

LONDON,
Printed for William Lee at the Turks-head
in Fleetstreet. 1669.
HISTORY

Saved by Revolution

OF

LIFE AND DEATH

OR

Old Age and Young Life

Which of these is the Better?

Principly for Young Men to Read and Ponder

In Edinburgh, 1755
TO THE READER.

Am to give Advertisement, that there came forth of late a Translation of this Book by an unknown Person, who though he wished well to the propagating of his Lordships Works, yet he was altogether unacquainted with his Lordships style and manner of Expressions, and so published a Translation lame and defective in the whole. Whereupon I thought fit to recommend the same to be translated anew by a more diligent and zealous Pen, which hath since travelled in it; and though it still comes short of that lively and incomparable Spirit and Expression, which lived and died with the Author, yet I dare avouch it to be much more warrantable and agreeable then the former. It is true, this Book was not intended to have been published in English; but seeing it hath been already made free of that Language, whatsoever benefit or delight may redound from it, I commend the same to the Courteous and Judicious Reader.

W. R.

A 2
To the present Age and Posterity.

Greeting.

Although I had ranked the History of Life and Death as the last amongst my Six Monethly Designations; yet I have thought fit, in respect of the prime use thereof, (in which the least loss of time ought to be esteemed precious) to invert that order, and to send it forth in the second place. For I have hope, and wish, that it may conduce to a common good; and that the Nobler sort of Physicians will advance their thoughts, and not employ their times wholly in the sordidness of Cures, neither be honored for Necessity onely, but that they will become Coadju- tors and Instruments of the Divine Omnipotence and Clemency in Prolonging and Renewing the Life of Man; especially seeing I prescribe it to be done by safe, and convenient, and civil ways, though hitherto unassayed. For though we Christians do continually aspire and pant after the Land of Promise; yet it will be a token of Gods favor towards us, in our journeyings through this Worlds Wilderness; to have our shoes and Gar- ments (I mean those of our frail Bodies) little worn or impaired.

Fr. St. Albans.
THE

HISTORY

OF

Life and Death.

The Preface.

T is an ancient saying and complaint, That Life is short and Art long; wherefore it behoveth us, who make it our chiefest aim to perfect Art, to take upon us the consideration of Prolonging Mans Life, GOD, the Author of all Truth and Life, prospering our Endeavors. For though the Life of Man be nothing else but a mals and accumulation of sins and sorrows, and they that look for an Eternal Life let but

light by a Temporary: Yet the continuation of VWorks of Charity ought not to be contemned, even by us Christians. Besides, the beloved Disciple of our Lord survived the other Disciples; and many of the Fathers of the Church, especially of the holy Monks and Hermits, were long-lived. Which shews, that this blessing of long life, so often promised in the Old Law, had left abatement after our Saviour's days then other earthly blessings had; but to esteem of this as the chiefest good, we are but too prone. Onely the enquiry is difficult how to attain the same; and so much the rather, because it is corrupted with false opinions and vain reports: For both those things which the vulgar Physicians talk of, Radical Moisture and Natural Heat, are but meet Fictions; and the immoderate
praises of Chemical Medicines, first puff up with vain hopes, and then fail their admirers.

And as for that Death which is caused by Suffocation, Putrefaction, and several Diseases, we speak not of it now, for that pertains to an History of Physick, but only of that Death which comes by a total decay of the Body, and the Intconciption of old Age. Nevertheless, the last act of Death, and the very extinguishing of Life it self, which may so many ways be wrought outwardly and inwardly (which notwithstanding have, as it were, one common Porch before it comes to the point of death) will be pertinent to be inquired of in this Treflate; but we reserve that for the last place.

That which may be repaired by degrees, without a total waste of the first Stock, is potentially eternal, as the Vefal Fire. Therefore when Physicians and Philofophers faw that living Creatures were nourifhed and their Bodies repaired, but that this did last onely for a time, and afterwards came old age, and in the end dissolution; they fough Death in over what which could not properly be repaired, supposing a Radical Miffortune incapable of solid reparation, and which, from the first infancy, received a fpurious addition, but no true reparation, whereby it grew daily worse and worse, and, in the end, brought the bad tonone at all. This conceit of theirs was both ignorant and vain; for all things in living Creatures are in their youth repaired entirely; nay, they are for a time increased in quantity, bettered in quality, fo as the Matter of reparation might be eternal, if the Manner of reparation did not fail. But this is the truth of it. There is in the declining of age an unequal reparation; some parts are repaired easily, others with difticulty and to their lofs; fo as from that time the Bodies of Men begin to endure the torment of MeZenius, That the living die in the embraces of the dead; and the parts easily repairable, through their conjunction with the parts hardly repairable, do decay: For the Spirits, Blood, Fleth, and Fat are, even after the decline of yeares, easily repaired; but the drier and more porous parts as the Membranes, all the Tumefces, the Sinews, Arteries, Veins, Bones, Cartilages, most of the Bowels, in a word, almost all the Organical Parts) are hardly repairable, and to their lofs. Now these hardly-repairable parts, when they come to their office of repairing the other which are easily repairable, finding themselves deprived of their wonted ability and strength, cease to perform any longer their proper Functions: By which means it comes to pafs, that in process of time the whole tends to dissolution; and even those very parts which in their own nature are with much ease repairable, yet through the decay of the Organs of reparation can no more receive reparation, but decline and in the end utterly fail. And the cause of the termination of Life is this, for that the Spirits, like a gentle flame, continually preying upon Bodies, confpining with the outward Air, which is ever sucking and drying of them, do, in time, destroy the whole Fabric of the Body, as also the particular Engines and Organs thereof, and make them unable for the Work of Reparation. These are the true ways of Natural Death, well and faithfully to be revolved in our minds; for he that knows not the ways of Nature, how can he succor her, or turn her about?

Therefore the Inquisition ought to be twofold; the one touching the Consumption or Depredation of the Body of Man; the other touching the Reparation and Renovation of the same: To the end, that the former may,
as much as is possible, be forbidden and restrained, and the latter comforted. The former of these pertains, especially to the Spirits and outward Air, by which the Depredation and Waste is committed; the latter to the whole race of Alimentation or Nourishment, whereby the Renovation or Restitution is made. And as for the former part touching Consumption, this hath many things common with Bodies Inanimate, or without life. For such things as the Native Spirit (which is in all tangible Bodies, whether living or without life) and the ambient or external Air worketh upon Bodies Inanimate, the same it attempteth upon Animate or Living Bodies; although the Vital Spirit superadded, doth partly break and bridle those operations, partly exalt and advance them wonderfully. For it is most manifest that Inanimate Bodies (most of them) will endure a long time without any Reparation; but Bodies Animate without Food and Reparation suddenly fall and are extinguished, as the Fire is. So then, our Inquisition shall be double. First, we will consider the Body of Man as Inanimate, and not repaired by Nourishment: Secondly, as Animate and repaired by Nourishment. Thus having Prefaced these things, we come now to the Topick places of Inquisition.
THE

Particular Topick Places;

OR,

ARTICLES of INQUISITION

TOUCHING

LIFE and DEATH.

In first inquiry of Nature durable, and Not durable, in Bodies Inanimate or without Life, as also in Vegetables; but that not in a large or full Treatise, but in a Breviary or Summary only.

Also inquire diligently of Defecation, Arefection, and Consumption of Bodies Inanimate, and of Vegetables; and of the ways and processes by which they are done; and further, of Inhibiting and Delaying of Defecation, Arefection, and Consumption, and of the Conservation of Bodies, in their proper state; and again, of the Inarnation, Emolition, and Recovery of Bodies to their former freshness, after they be once dried and withered.

Neither need the Inquisition touching these things, to be full or exact, seeing they pertain rather to their proper Title of Nature durable; seeing also, they are not Principals in this Inquisition, but serve onely to give light to the Prolongation and Inarnation of Life in Living Creatures. In which (as was said before) the same things come to pass, but in a particular manner. So from the Inquisition touching Bodies Inanimate and Vegetables, lett the Inquisition pass on to other Living Creatures besides Men.

Inquire touching the length and shortness of Life in Living Creatures, with the due circumstances which make most for their long or short lives.

But because the Duration of Bodies is twofold, One in Identity, or the self-same subsistence, the other by a Renovation or Repairation; whereas of the former hath place only in Bodies Inanimate, the latter in Vegetables and Living Creatures, and is perfected by Alimentation or Nourishment; therefore it will be fit to inquire of Alimentation, and of the ways and processes thereof; yet this not exactly, (because it pertains properly to the Titles of Assimilation and Alimentation) but, as the rest, in progress only.

From the Inquisition touching Living Creatures, and Bodies repaired by Nourishment, pass on to the Inquisition touching Men. And now being come to the principal subject of Inquisition, the Inquisition ought to be in all points more precise and accurate.

Inquire touching the length and shortness of Life in Men, according to the Ages of the world, the several Regions, Climates, and Places of their Nativity and Habitation.

Inquire touching the length and shortness of Life in Men, according to their Races and Families, as if it were a thing hereditary; also according to their Complexions, Constitutions, and Habits of Body, their Status, the manner and time of their growth, and the making and composition of their Members.

Inquire touching the length and shortness of Life in Men, according to the times of their Nativity; but so, as you omit for the present all Astrological observations, and the Figures of Heaven, under which they were born; only insist upon the vulgar and manifest
The History of Life and Death.

manifest Observations; as whether they were born in the Seventh, Eighth, Ninth, or Tenth Moneth; also, whether by Night or by Day, and in what Moneth of the Year.

Inquire touching the Length and Shortness of Life in Men, according to their Air, Diet, Government of their Life, Exercises, and the like. For as for the Air, in which Men live and make their abode, we account that proper to be inquired of in the above-mentioned Article, touching the places of their Habitation.

Inquire touching the Length and Shortness of Life in Men, according to their Studies, their several Concerns of Life, the Affections of the Mind, and divers Accidents befalling them.

Inquire apart touching those Medicines which are thought to prolong Life.

Inquire touching the Signs and Prognosticks of long and short life; not those which betoken Death at hand, (for they belong to an History of Physick) but those which are seen and may be observed even in Health, whether they be Physiognomical signs, or any other.

Hichert have been propounded Inquisitions touching Length and Shortness of Life, besides the Rules of Art, and in a confused manner; now we think to add some, which shall be more Art-like, and tending to practice, under the name of Intentions. Those Intentions are generally three: As for the particular Distributions of them, we will propound them when we come to the Inquisition it self. The three general Intentions are, the Forbidding of Waste and Consumption, the PERFECTING of Reparation, and the RENEWING of Oldness.

Inquire touching those things which conserve and exempt the Body of Man from Aversion and consumption, at least which put off and protect the inclination thereunto.

Inquire touching those things which pertain to the whole processes of Alimentation, (by which the Body of Man is repaired) that it may be good, and with the best improvement.

Inquire touching those things which purge out the old Matter, and supply with new; as also which do Intenerate and Moisten those parts which are already dried and hardened. But because it will be hard to know the Ways of Death, unless we search out and discover the State, or House, or rather Den of Death, it will be convenient to make Inquisition of this thing; yet not of every kind of Death, but of those Deaths which are caused by want and indigence of Nourishment, not by violence; for they are those Deaths alone which pertain to a decay of Nature, and meet old Age.

Inquire touching the Point of Death, and the Porches of Death, leading thence to from all parts, so as that Death be caused by a decay of Nature, and not by Violence.

Lastly, because it is behoven to know the Character and Form of Old Age, which will then best be done, if you make a collection of all the Differences, both in the State and Functions of the Body, betwixt Youth and Old Age, that by them you may observe what it is that produceth such manifold Effects; let not this Inquisition be omitted.

Inquire diligently touching the Differences in the State of the Body and Functions of the Mind in Youth and Old Age; and whether there be any that remain the same without alteration or abatement in Old Age.

Nature Durable, and not Durable.

The History.

Meteals are of that long lasting, that Men cannot trace the beginnings of them; and when they do decay, they decay through RUST, not through periphrasis into Air; yet Gold decays neither way.

Quick-Silver, though it be an humid and fluid Body, and easily made volatile by Fire; yet (as far as we have observed) by Age alone, without Fire, it neither wafteth nor gathereth Rust.

Stones, especially the harder sort of them, and many other Fossiles, are of long lasting...
The History of Life and Death.

In general, and that though they be exposed to the open air; much more if they be buried in the earth. Notwithstanding Stones gather a kind of 

Precious Stones and Crystals exceed Metals in long lasting; but then they grow dimmer and less Orient, if they be very old.

It is observed, that Stones lying towards the North do sooner decay with age than those that lie toward the South; and that appears manifestly in Pyramids, and Churches, and other ancient buildings: contrariwise, in Iron, that exposed to the South, gathers Rust sooner, and that to the North later; as may be seen in the Iron-barst of windows. And no marvel, seeing it in all purifica
tion (as Rust is) Moiure toughens Difsolution; in all such Arefation, Drinck.

In Vegetables, (we speak of such as are fell’d, not growing) the Stocks or Bodies of harder Trees, and the Timber made of them, last divers ages. But then there is difference in the bodies of Trees: some Trees are in a manner spongy as the Elder, in which the pith in the middle is soft, and the outward part harder; but in Timber-trees, as the Oak, the inner part (which they call Heart of Oak) lasteth longer.

The Leaves, and Flowers, and Stalk of Plants are but of short lasting, but dissolve into dust, unless they putrefy: the Roots are more durable.

The Bones of Living Creatures last long, as we may see it of mens bones in Charnel-houses: Horns also last very long; so do Teeth, as it is seen in Ivory, and the Sea-horse Teeth.

Hides also and Skins endure very long, as is evident in old Parchment-books: Paper like wise will last many ages, though not so long as Parchment.

Such things as have passed the Fire last long, as Glass and Bricks; likewise Flesh and Fruits that have passed the Fire last longer than Raw: and that not only because the Baking in the Fire forbids putrefaction; but also because the watry humour being drawn forth, the oily humour supports it self the longer.

Water of all Liquors is soonest drunk up by Air, contrariwise Oil lasteth; which we may see not only in the Liquors themselves, but in the Liquors mixt with other Bodies: for Paper wet with water, and so getting some degree of transparenty, will soon after wax white, and lose the transparenty, the watry vapour exhaling; but oiled Paper will keep the transparenty long, the Oil not being apt to exhal: And therefore they that counterfeit mens hands, will lay the oiled paper upon the writing they mean to counterfeit, and then affay to draw the lines.

Gums all of them last very long; the like do wax and Honey.

But the equal or unequall life of things conduceth no less to long lasting or short lasting, than the things themselves; for Timber, and Stones, and other bodies, standing continually in the water, or continually in the air, last longer than if they were sometimes wet, sometimes dry; and so Stones continue longer, if they be laid towards the same coast of Heaven in the Building that they lay in the Mine. The fame is of Plants removed, if they be casted just as they were before.

Observation.

Let this be laid for a Foundation, which is most sure, That there is in every Tangiblebody a Spirit, or Body Pneumatic, enclosed and covered with the Tangible parts; and that from this Spirit is the beginning of all Dissolution and Consumption, so as the Antidote against them is the detaining of this Spirit.

This Spirit is detained two ways: either by a stricte Inclosure, as it were in a Prison; or by a kind of free and voluntary Detention. Again, this voluntary Stay is persuaded two ways: either if the Spirit is self be not too moveable or eager to depart; or if the external Air importune it not too much to come forth. So then, two sorts of Substances are durable, Hard Substances, and Oily: Hard Substance kind of the Spirits else; Only partly entices the Spirit to Stay, partly is of that nature that it is not importuned by Air; for Air is subjunctional to Water, and Flame to Oil. And touching Nature Durable and not Durable in Bodies Intimate, thus much.

The History.

Herbs of the colder sort die yearly both in Root and Stalk; as Lettuce, Parslane; also Wheat and all kind of Corn: yet there are some cold Herbs which will last

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three or four years; as the Violet, Straw-berry, Burnet, Prim-rose, and Sorrel. But Borage and Bugloss, which seem so alike when they are alive, differ in their deaths; for Borage will last but one year, Bugloss will last more.

But many forties bear their age and years better; Hysop, thyme, Savory, Pot-marjoram, balm, wormwood, Germander, and the like. Fennel dies yearly in the fall, but Lavandula and Sweet-marjoram can better endure age than winter; for being set in a very warm place and well-fenced, they will live more than one year. It is known, that a knot of Hysop twice a year hath continued forty years.

Bushes and shrubs live three-score years, and some double as much. A Vine may attain to three-score years, and continue fruitful in the old age. Rosemary well placed will come also to three-score years; but White Thorn and Ivy endure above an hundred years. As for the Bramble, the age thereof is not certainly known, because bowing the head to the ground it gets new roots, so as you cannot distinguish the old from the new.

Amongst great Trees the longest livers are the Oak, the Holm, Wild ash, the Elm, the Beech tree, the Chestnut, the Plane tree, Ficus Ruminalis, the Live Oak, the wild Olive, the Palm-tree and the Mulberry tree. Of these, some have come to the age of eight hundred years; but the leafy lives of them do attain to two hundred.

But Trees Cereus, or that have sweet woods, as Trees Rosmarus, last longer in their Woods or Timber than those above-said, but they are not so long-lived; as the Cypress, Maple, Lime, box, Juniper. The Cedar being born out by the raifings of his body, lives well near as long as the former.

The Ash, fertile and forward in bearing, reacheth to an hundred years and somewhat better; which also the Birch, Maple, and Service tree sometimes do: but the Poplar, Lime-tree, willow, and that which they call the Sequoem, and Amais-tree, live not so long.

The Apple-tree, Pear-tree, Plum-tree, Pomegranate-tree, Catar-tree, Medlar-tree, Black cherry tree, Cherry-tree, may attain to fifty or sixty years; especially if they be cleansed from the Moths wither some of them are cloathed.

Generally, greatnes of body in trees, if other things be equal, hath some congruity with length of life; so hath hardnes of substance: and trees bearing Moss or Nuts are commonly longer livers than trees bearing fruit or berries likewise trees putting forth their leaves late, and shedding them late again, live longer than those that are early either in leaves or fruit; the like is of wild-tree in comparison of Orchard-trees. And lastly, in the same kind, trees that bear a four fruit out-live those that bear a single fruit.

An Observation.

A Riflotto noted well the difference between Plants and living Creatures, in respect of their Nourishment and Reparation. Namely, that the bodies of living Creatures are confirmed within certain bounds, and that after they be come to their full growth they are continued and preserved by Nourishment, but they put forth nothing new except Hair and Nails, which are counted for no better than Excrements; so as the juice of living creatures must of necessiety sooner wax old: but in Trees, which put forth yearly new boughs, new lilles, new leaves, and new fruits, it comes to pass that all these parts in Trees are once a year young and renewed. Now it being so, that whatsoever is fresh and young draws the Nourishment more lively and cheerfully to it than that which is decayed andold, it happens withal, that the stock and body of the tree, through which the sap paffeth to the branches, is refreshed and cleared with a more bountiful and vigorous nourishment in the passage than otherwise it would have been. And this appears manifest (though Riflotto noted it not, neither hath be expressed these things so clearly and perspicuously) in Hedges, Coples, and Pollards; when the plaining, the eddying, and lopping comforteth the old item or flock, and maketh it more flourishing and longer liv'd.
The History of Life and Death.

Defecation, Prohibiting of Defecation, and In-generation of that which is defecated and dried.

Fire and strong Heats dry some things, and melt others.

Lims us dic durefit, &c hac me Cera liquefit, Quo codemque igne?

How this Clay is hardened, and how this wax is melted, with one and the same thing.

Fire? It dries Earth, Stones, wood, Cloth, and Skins, and whatsoever is not liquefiable; and it melts Metals, wax, Gums, Butter, Tallow, and the like.

Notwithstanding, even in those things which the fire melteth, if it be very vehement and continueth, it doth at last dry them. For metal in a strong fire, (Gold only excepted) the volatile part being gone forth, will become less ponderous and more brittle; and those oily and fatty substances in the like fire will burn up, and be dried and parched.

Air, especially open Air, doth manifestly dry, but not melt: as high ways, and the upper part of the Earth, moistened with showers, are dried; limen, clothes washed, if they be hang'd out in the air, are likewise dried; herbs, and leaves, and flowers, laid forth in the shade, are dried. But much more foolishly doth the air this, if it be either enlightened with the Sun-beams, (so that they cause no putrefaction) or if the air be stirred, as when the wind bloweth, or in rooms open on all sides.

Age most of all, but yet floweget all, drieth; as in all bodies which (if they be not prevented by putrefaction) are drye with Age. But age is nothing of it self, being only the measure of time; that which causeth the effect is the native Spirit of bodies, whichHacketh up the moisture of the body, and then, together with it, lieth forth; and the air ambient, which multiplieth it self upon the native spirits and juices of the body, and preyleth upon them.

Cold of all things most properly drieth: for drying is not caused but by contraction; now contraction is the proper work of cold. But because we Men have heat in a high degree, namely, that of Fire, but cold in a very low degree, no other than that of 

Water, or perhaps of Ice, or of Snow, or of 

Fire; therefore the drying caused by cold is but weak, and easily resolved. Notwithstanding we fee the surface of the earth to be more dryed by Froiz, or by March-winds, than by the sun, seeing the same wind both licketh up the moisture and affecteth with coldness.

Smoke is a drier than Bacon and Neats tongues which are hang'd up in the chimneys: and 

Perfumes of Olibanum, or Lignum Albus, and the like, dry the Brain, and cure Catarrhs.

Salt, after some reasonable continuance, drieth, not only on the out-side, but in the inside also; as in Fleb and Fish salted, which if they have continued any long time have a manifest hardness within.

Hot Gums applied to the skin dry and wrinkle it; and some acrimonious waters also do the same.

Spirit of strong waters imitate the fire in drying: for it will both potch an Egg put into it, and toast Bread.

Powders dry like Spagges by drinking up the moisture, as it is in Sand thrown upon Lines new written: also smoothness and pleasantness of bodies, (which suffer not the vapour of moisture to go in by the pores) dry by accident, because it expellet it to the air; as it is seen in precious stones, Looking glasses, and Blades of swords, upon which if you breath, you shall see at first a little mist, but soon after it vaniseth like a cloud. And thus much for Defecation or Drying.

They use at this day in the East parts of Germany Garners in Vaults under ground, wherein they keep 

Wheat and other grains, laying a good quantity of straw both under the grains and about them, to save them from the dampness of the Vault: by which device they keep their grains 20 or 30 years. And this doth not only preserve them from rustiness, but (that which pertains more to the present inguisition) preserves them also in that greenness that they are fit and serviceable to make bread. The fame is reported to have been in use in Cappadocia and Thracia, and some parts of Spain.

The placing of Garners on the tops of houses, with windows towards the East and North, is very commodious. Some also make two Sollars, an upper and a lower; and the upper Sollar hath an hole in it, through which the grain continually descendeth, like sand in an hour-glass, and after a few days they throw it up again with shovels, that so it may be in continual motion. Now it is to be noted
that this doth not only prevent the Fustiness, but conserveth the Greeness, and slacketh the Defection of it. The Cause is that which we noted before, That the discharging of the \textit{W\text{\textstyle{a}}ry humour}, which is quickened by the \textit{Movement} and the \textit{Wind}, prefers the \textit{Oily humour} in his being, which otherwise would fly out together with the \textit{W\text{\textstyle{a}}ry humour}. Alfo in some Mountains, where the Air is very pure, dead Carafes may be kept for a good while without any great decay.

13. Fruits, as Pomegranates, Citrons, Apples, Pears, and the like; also Flowers, as Roses and Lilies, may be kept a long time in Earthen Vefhels clofe floated: howfoever, they are not free from the injuries of the outward Air, which will affect them with his unequal Temper through the fides of the Vefhel, as it is manifeft in heat and cold. Therefore it will be good to flop the mouths of the Vefhels carefully, and to bury them within the Earth; and it will be as good not to bury them in the Earth, but to fink them in the \textit{Water}, fo as the place be shady, as in Wells or Cifterns placed within doors: but thofe that be fink in Water will do better in Glass vefhels than in Earthen.

14. Generally thofe things which are kept in the Earth, or in Vaults under ground, or in the bottom of a Well, will preferves their freckines longer than thofe things that are kept above ground.

They fay it hath been obferved, that in \textit{Con fervatories of Snow} (whether they were in Mountains, in natural Pits, or in Wells made by Art for that purpofe) an Apple, or other fresh Vefhels, or Nut, by chance falling in, after many months, when the Snow hath melted, hath been found in the Snow as fresh and fair as if it had been gathered the day before.

Country people keep Clafhers of Grapes in Meal, which though it makes them lefs pleasant to the taste, yet it preferves their meiflure and freehnes. Alfo the harder fort of Fruits may be kept long, not only in Meal, but alfo in Saw-duff, and in heaps of Corn.

There is an opinion held, that Bodies may be preferved fresh in Liquors of their own kind, as in their proper Menftrua; as, to keep Grapes in Wine, Olives in Oil.

18. Pomegranates and Quinces are kept long, being lightly dipped in Sea-water or Saltwater, and then after taken out again, and then dried in the open Air, fo be in the Shade.

Bodies put in Wine, Oil, or the Lees of Oil, keep long; much more in Flask or Spirit of Wine; but moft of all, as some fay, in Quick-fifer.

19. Fruits inclofed in Wax, Pitch, Flafhter, Paste, or any the like Cace or Covering, keeps green very long.

It is manifeft that Flies, Spiders, Ants, or the like small creatures, falling by chance into Amber, or the Guns of Trees, and fo finding a burial in them, do never after corrupt or rot, although they be soft and tender Bodies.

20. Grapes are kept long by being hanged up in bunches: the fame is of other Fruits. For there is a two-fold Commodity of this thing, the one, that they are kept without prefing or bruifing, which they muft needs suffer if they were laid upon any hard Subftance; the other, that the Air doth encompass them on every fide alike.

It is obferved that PretreSfluer, no lefs than Derfication in Vegetables, doth not begin in every part alike, but chiefly in that part where, being alive, it did attract nourifhment. Therefore some advise to cover the flalks of Apples or other Fruits with Wax or Pitch.

24. Great Wicks of Candles or Lamps do sooner consume the Tallow or Oil than leffer Wicks; alfo Wicks of Cotton sooner than thofe of Raff, or Straw, or fmall Things: and in Staves of Torches, thofe of Jumper or Fire sooner than thofe of As: likewise Flame moved and fanned with the Wind sooner than that which is fift: And therefore Candles let in a Lanthorn will laft longer than in the open Air. There is a Tradition, that Lamps let in Sepulchres will laft an incredible time.

25. The Nature alfo and Preparation of the \textit{Graftesment} condueth no lefs to the lofting of Lamps and Candles, than the nature of the Flame; for Wax will laft longer than Tallow, and Tallow a little wet longer than Tallow dry; and Wax candles old made longer than Wax-candles new made.

26. Trees, if you fir the Earth about their Root every year, will continue leff time: if once in four, or perhaps in ten years, much longer: alfo cutting off the Suckers and young Shoots will make them live the longer: but Drench them, or laying of Manure about their Roots, or much Watering them, adds to their fertility, but cuts off from their long lafting. And thus much touching the \textit{Prohibiting of Derfication or Conflagration}. The
The History of Life and Death.

The Intercarnation or making tender of that which is dried (which is the chief Matter) affords but a small number of Experiments. And therefore some few Experiments which are found in Living Creatures, and also in Man shall be joined together.

Bands of Water, wherewith they use to bind Trees, laid in Water, grow more flexible; likewise they put Boughs of Birch (the ends of them) in Earthen Pots filled with Water, to keep them from withering; and Bowls filled with dryness, keep'd in Water, close again.

Boots grown hard and obdurate with age, by greasing them before the Fire with Tallow, wax soft, or being openly held before the Fire get some softness. Bladders and Parchments hardned also become tender with warm Water, mixed with Tallow or any Fat thing; but much the better, if they be a little chafed.

Trees grown very old, that have stood long without any culture, by digging and opening the Earth about the Roots of them, seem to grow young again, and put forth young Branches.

Old Draught Oxen worn out with labor, being taken from the yoak, and put into fresh Pasture, will get young and tender flesh again, in so much, that they will eat as freely and tender as a Steer.

A strict Emaciating Diet of Granaum, Bisket, and the like, (wherewith they use to care the French-Pox, Old catarrhus, and some kind of Dropies) doth first bring men to great poverty and leanness, by wafting the Juices and Humors of the Body; which after they begin to be repaired again, seem manifestly more vigorous and young. Nay, and I am of opinion, that Emaciating Diseases afterwards well cured, have advanced many in the way of long life.

Observations.

Men see clearly, like Owls, in the Night of their own Notions; but in Experience, as in the Day-light they wink and are but half-sightht. They speak much of the Elementary quality of Sickness or Disease, and of things Desiccating, and of the Natural Periods of Bodies, in which they are corrupted and consumed: But mean while, either in the beginnings, or middle passages, or last acts of Desiccation and Consumption, they observe nothing that is of moment.

Desiccation or Consumption in the properst thereof, is finished by three Actions, and all these (as was said before) have their original from the Native Spirit of Bodies.

The first Action, the Attenuation of the Moisture into Spirit: the second is, the Iffuing forth or flight of the Spirit; the third is, the Contraction of the groffer parts of the Body immediately after the Spirit issed forth. And this last is, that Desiccation and Induration which we briefly handle; the former two consume only.

Touched Attenuation, the matter is manifest. Forti's Spirit which is enclosed in every Tangible Body forges not its nature, but whatsoever it meets withal in the Body (in which it is enclosed) that it can digest and master, and turn into its self, that it plainly alters and subdues, and multiplies itself upon it, and begotts new Spirit. And this evinc'd by one proof, of many; for that which is which are strongly dried are lesened in their weight, and become hollow, porous, and resounding from within. Now it is most certain, that the inward Spirit of any thing, confers nothing to the weight, but rather lesens it; and therefore it must needs be, that the same Spirit has turn'd into that moisture and juice of the Body which weighed before, by which means the weight is lesened. And this is the first Action, the Attenuation of the Moisture, and converting it into Spirit.

The second Action, which is the issuing forth or Flight of the Spirit, is manifest also. For the issuing forth, when it is in things, is apparent even to the sense; in Vapors to the flight, in Odors to the smelling; but if it issueth forth slowly, (as when a thing is decay'd by age) then it is not apparent to the sense; but the matter is the same. Again, where the compoysure of the Body is either so firm or so tenacious, that the Spirit can finde no porsonal passages by which to departs, then, in the trying to get out, it diviseth before it the groffer parts of the Body, and protrudes them beyond the superficies or surface of the Body; as it is in the raft of Metals, and mould of all Fat things. And this is the second Action, the issuing forth or Flight of the Spirit.

The third Action is somewhat more obscure, but full as certain; that is, the Contraction of the groffer parts after the Spirit issueth forth. And this appears, first, in that Bodies after the Spirit issueth forth, do manifestly shrunk, and fill a less room; as it is in the
The History of Life and Death.

The Kernels of Nuts, which after they are dried, are too little for the Shells; and in Beans and Flanchers of Houses, which at first lay close together, but after they are dried, give; and likewise in Bowls, which through drought, grow full of cranes, the parts of the Bowl contracting themselves together, and after contraction must needs be empty spaces. Secondly, it appears by the wrinkles of Bodies dried: For the endeavor of contracting it self is such; that by the contraction it brings the parts nearer together, and so fills them up; for whatsoever is contracted on the sides, is lifted up in the midst: And this is so to be seen in Papers and old Parchments, and the Skins of Living Creatures, and in the Coats of soft Cheeses, all which, with age, gather wrinkles. Thirdly, This Contraction shows itself most in those things, which by heat are not only wrinkled, but ruffled, and pleated, and, as it were, rouled together; as it is in Papers, and Parchments, and Leaves, brought near the fire: For Contraction by Age, which is more slow, commonly causes wrinkles; but Contraction by the Fire, which is more speedy, causes pleating. Now in most things where it comes not to wrinkling or pleathing, there is simple Contraction, and angulization or slanting, and induration or hardening, and deficcation, as was shown in the first place. But if the issuing forth of the Spirit, and assumption or waft of the Moisture be so great, that there is not left body sufficient to unite and contract it self; then is necessary Contraction must cease, and the body become putrid, and nothing else but a little dust clearing together, which with a light touch is dispersed and fallen asunder; as it is in Bodies that are rotten, and in Paper burnt, and Linnen made into Tinder, and Corkselves embossed after many ages. And this is the third Action, the Contraction of the grosser parts after the Spirit issueth forth.

It is to be noted, that Fire and Heat dry only by accident; for their proper work is to attenuate and dilate the Spirit and Moisture; and then it follows by accident, that the other parts should contract themselves, either for the flying of Vacuum alone, or for some other motion without, whereof we now speak not.

It is certain, that Putrefaction takes in its original from the Native Spirit; and then Archaization; but it goeth on a far different way: For in Putrefaction, the Spirit is not simply vaporized forth, but being detained in part, works strange garboils; and the graver parts are not so much locally contracted, as they congregate themselves to parts of the same nature.

Length and Shortness of Life in Living Creatures.

The History.

To the first Article.

Looking the Length and Shortness of Life in Living Creatures, the Information which may be had, is but slender. Observation is negligent, and Tradition fabulous. In Tame Creatures, their degenerate life corruptions them; in Wilde Creatures, their exposting to all weathers, often interpepieth them. Neither do those things which may seem conjunctive, give any farther to this information, (the greatness of their Bodies, their time of Bearing in the Womb, the number of their young ones, the time of their growth, and the rest) in regard that these things are intermixed, and sometimes they concur, sometimes they sever.

Mans age (as far as can be gathered by any certain Narration) doth exceed the age of all other Living Creatures, except it be of a very few only; and the Concomitants in him are very equally dispos'd, his stature and proportion large, his bearing in the womb nine months, his fruit commonly one at a birth, his puberty at the age of fourteen years, his time of growing till twenty.

The Elephant by undoubted relation, exceeds the ordinary race of Mans life; but his bearing in the Womb the space of Ten years, is fabulous; of two years, or at least above one, is certain. Now his bulkis great, his time of growth until the thirtieth, his teeth exceeding hard; neither hath it been observed, that his blood is the coldest of all Creatures: His age hath sometimes reached to Two hundred years.

Lions are accounted long livers, because many of them have been found Toothless, a sign not to certain, for that may be caused by their strong breath.

The Bear is a great sleeper; a dull beast, and given to cafe; and yet not noted for
The History of Life and Death.

for long life: nay, he hath this sign of short life, that his being in the womb is but short, scarce full forty days.

The Fox seems to be well disposed in many things for long life; he is well skinned, feeds on flesh, lives in dens; and yet he is not noted not to have that property. Certainly he is a kind of Dog and that kind is but short-lived.

The Camel is a long lives, a lean Creature, and finewy, so that he doth ordinarily attain to fifty, and sometimes to an hundred years.

The Horse lives but to a moderate age, scarce to forty years, his ordinary period is twenty years: but perhaps he is beholden for this shortness of life to Man; for we have now no Horse of the Sun, that live freely, and at pleasure, in good pastures. Notwithstanding the Horse grows till he be fix years old, and is able for generation in his old age. Besides, the Mare goeth longer with her young one than a woman, and brings forth, two at a burthen more rarely. The As lives commonly to the Horse's age; but the Mule outlives them both.

The Hare is famous amongst men for long life, yet not upon any relation that is undoubted. They tell of a certain Hare that was found with a Collar about his neck, and that Collar hidden with Fat. The long life of the Hare is the less credible, because he comes to his perfection at the fifth year; and not long after his Horns (which he sheds and renews yearly) grow more narrow at the Root, and less branched.

The Dog is but a short liver, he exceeds not the age of twenty years, and for the most part lives not to fourteen years: a Creature of the hottest temper, and living in extremes: for he is commonly either in vehement motion, or sleeping: besides, the Bitebr bringeth forth many at Burden, and goeth nine weeks.

The Ox is like wise, for the greatness of his body and strength, is but a short liver, about some sixteen years, and the males live longer than the Females; notwithstanding they bear usually but one at a burden, and go nine months: a Creature dull, feathyr, and soon fatted, and living only upon Herby substances, without Grain.

The Sheep seldom lives to ten years, though he be a creature of a moderate size, and excellently clad; and, that which may seem a wonder, being a creature with so little a Gall, yet he hath the most curdled Coat of all, other, for the Hair of no Creature is so much curdled as wool is. The Rams generate not before the third; car, and continue able for generation until the eight. The Ewe bear young as long as they live. The Sheep is a defaced Creature, and rarely lives to his full age.

The Goat lives to the same age with the Sheep, and is not much unlike in other things; though he be a Creature more nimble, and of somewhat a firmer flesh, and so should be longer-lived; but then he is much more lascivious, and that shortens his life.

The Cow lives to fifteen years, sometimes to twenty: and though it be a Creature of the mostfeft flesh, yet that seems to make nothing to Length of Life. Of the Wild bear or Cow we have nothing certain.

The Cat's age is between fix and ten years: a creature nimble and full of spirit: whose feed (as Aelian reports) burneth the Female; whereupon it is said, That the Cat conserves with pain, and brings forth with ease: A Creature ravenous in eating, rather swallowing down his meat whole than feeding.

Hares and Hounds attain scarce to seven years, being both Creatures generative, and with young ones of several conceptions in their bellies. In this they are unlike, that the Conyl lives under ground; and the Hare above ground; and again, that the Hare is of a more dainty flesh.

Birds for the size of their bodies are much less than Beasts; for an Eagle or Swan is but a small thing in comparison of an Ox or Horse, and so is an Eelish to an Elephant.

Birds are excellently well clad: for Feathers, for warmth and close fitting to the body, exceed Wool and Hairs.

Birds, though they hatch many young ones together, yet they bear them not all in their bodies at once, but lay their Eggs by turns, whereby their Fruit hath the more plentiful nourishment whilst it is in their bodies.

Birds chew little or nothing, but their meat is found whole in their crops, notwithstanding they will break the shells of Fruits, and pick out the Kernels: they are thought to be of a very hot and strong concoction.
The motion of Birds in their flying is a mixt motion, consisting of a moving of the limbs, and of a kind of carriage; which is the most wholesome kind of Exercise.

Aristotle noted well touching the generation of Birds, (but he transferred it ill to other living Creatures) that the seed of the Male confers less to generation than the Female, but that it rather affords Activity than matter; so that fruitful Eggs and unfruitful Eggs are hardly distinguish'd.

Birds (almost all of them) come to their full growth the fifth year, or a little after.

It is true, that their Feathers in some kinds, and their Bills in others, shew their years, but for the growth of their Bodies it is not fo.

The Eagle is accounted a long liver, yet his years are not set down; and it is alledged as a sign of his long life, that he casts his Bill, whereby he grows young again: from whence comes that old Proverb, The old age of an Eagle. Nonwithstanding perchance the matter may be thus, That the renewing of the Eagle doth not cast his bill, but the casting of his bill is the renewing of the Eagle, for after that his bill is grown to a great crookedness, the Eagle feeds with much difficulty.

Vultures are also affirmed to be long livers, insomuch that they extend their life well near to an hundred years. Kites likewise, and fo all Birds that feed upon flesh, and Birds of prey live long. As for Hawks, because they lead a degenerate and fervile life for the delight of men, the term of their natural life is not certainly known: notwithstanding amongst Mewed Hawks some have been found to have lived thirty years, and amongst old Hawks forty years.

The Swan is certainly found to be a long liver, and exceeds not un frequency an hundred years. He is a Bird excellently plum'd, a feeder upon fish, and is always carried, and that in running waters.

The Goose also may pass amongst the long livers, though his food be commonly grass, and such kind of nourishment; especially the Wild Goose; whereupon this Proverb grew amongst the Germans, Magis fenex quam Anser nivalis, Older than a Wild Goose.

Storks must needs be long livers, if that be true which was anciently observed of them, that they never came to Thebes, because that City was often sacked. This if it were so, then either they must have the knowledge of more ages than one, or else the old ones must tell their youth the History. But there is nothing more frequent than Fables.

For Fables do so abound touching the Phoenix, that the truth is utterly lost if any such Bird there be. As for that which was so much admired, That fire was ever seen abroad with a great troop of Birds about her, it is no such wonder; for the same is usually seen about an Owl flying in the day-time, or a Parrot let out of a Cage.

The Parrot hath been certainly known to have lived three-score years in England, how old forever he was before he was brought over: a Bird eating almost all kind of meats, chewing his meat, and renewing his bill; likewisecurst and mischievous, and of a black fleth.

The Peacock lives twenty years; but he comes not forth with his Argus Eyes before he be three years old; a Bird flow of pace, having whitish flewh.

The Dung Hill Cock is voracious, martial, and but of a short life; a crank Bird, having also white fleth.

The Indian Cock, commonly called the Turkey Cock, lives not much longer than the Dung Hill Cock: an angry Bird, and hath exceeding white fleth.

The Ring Doves are of the longest sort of livers, in somuch that they attain sometimes to fifty years of age: an airy Bird, and both builds and sits on high. But Doves and Turtles are but short liv'd, not exceeding eight years.

But Pheasants and Partridges may live to fifteen years. They are great breeders, but not so white of fleth as the ordinary Pheen.
The History of Life and Death.

The Black bird is reported to be, amongst the lesser birds, one of the longest lives; an unhappy bird and a good finger.

The sparrow is noted to be of a very short life; and it is impeded in the Males to their sacrifices. But the Linnet, no bigger in body than the Sparrow, hath been observed to have lived twenty years.

Of the Etrich we have nothing certain: those that were kept here have been found fortunate, that no long life appeared by them. Of the bird Ibis we find only that he liveth long, but his years are not recorded.

The age of Fishes is more uncertain than that of terrestrial Creatures, because living under the water they are the less observed: many of them breathe not, by which means their vital spirit is more cloesed in; and therefore though they receive some refrigeration by their Gills, yet that refrigeration is not so continual as when it is by breathing.

They are free from the Defecation and Depredation of the Air ambient, because they live in the water: yet there is no doubt but the water ambient, and piercing, and received into the pores of the body, doth more hurt to long life than the Air doth.

It is affirmed too, that their blood is not warm. Some of them are great devourers, even of their own kind. Their flesh is softer and more tender than that of terrestrial creatures: they grow exceedingly fat, insomuch that an incredible quantity of Oyl will be extracted out of one Hake.

Dolphins are reported to live about thirty years; of which thing a trial was taken in some of them, by cutting off their tails: they grow until ten years of age.

That which they report of some Fishes is strange, that after a certain age their bodies will waste and grow very slender, solely their head and tail retaining their former greatness.

There were found in Caesar's Fifth ponds Lampreys, to have lived three-score years: they were grown so familiar with long use, that carrus the Orator solemnly lamented one of them.

The Pike amongst Fishes living in fresh water is found to last longest, sometimes to forty years: he is a Ravener, of a flesh somewhat dry and firm.

But the Carp, Bream, Tench, Eel, and the like, are not held to live above ten years.

Salmons are quick of growth, short of life; so are Trenches: but the Perch is slow of growth, long of life.

Touching that monstrous bulk of the Hake or Orca, how long it is weilded by vital spirit, we have received nothing certain; neither yet touching the Sea-calf, and Sea-hog, and other innumerables Fishes.

Rocodiles are reported to be exceeding long-liv'd, and are famous for the time of their growth, for that they, amongst all other Creatures, are thought to grow during their whole life. They are of those Creatures that lay Eggs, ravenous, cruel, and well-fenced against the waters. Touching the other kinds of shell-fish, we find nothing certain how long they live.

Observations.

To find out a Rule touching Length and Shortness of Life in Living Creatures is very difficult, by reason of the negligence of Observations, and the intermixing of Causes. A few things we will set down.

There are more kinds of Birds found to be long liv'd than of Beasts: as the Eagle, the Vulture, the Kite, the Pelican, the Raven, the Crow, the Swan, the Goose, the Stork, the Crane, the Bird called the Ibis, the Parrot, the Ring dove, with thereof, though they come to their full growth within a year, and are left of bodies: surely their clothing is excellent good against the dis temperances of the weather; and besides, living for the most part in the open Air, they are like the Inhabitants of pure Mountains, which are long-liv'd. Again, their Motion, which (as before we said) is a mixt Motion, compounded of a moving of their Limbs and of a carriage in the Air, doth less weary and wear them, and is more wholesome. Neither do they suffer any compression or want of nourishment in their mother's bellies, because the Eggs are laid by turns. But the chiefest cause of all I take to be this, that Birds are made more of the Sub stance of the Mother than of the Father, whereby their Spirits are not so eager and hot.
The History of Life and Death.

1. There may be a Position, that Creatures which partake more of the substance of their Mother than of their Father are longer-lived, as Birds are; which was said before. Also that those which have a longer time of bearing in the womb, do partake more of the substance of their Mother, less of the Father, and so are longer-lived: Insomuch that I am of opinion, that even amongst Men, (which I have noted in some) those that resemble their Mothers most are longest-lived; and so are the Children of Old men gotten of young Virgins, as the Fathers be found, not defaced.

2. The first breeding of Creatures is ever material, either to their hurt or benefit. And therefore it stands with reason, that the lesser Composition, and the more liberal Alimentation of the Young one in the womb, should confer much to Long Life. Now this happens when either the young ones are brought forth successively, as in Birds; or when they are single Births, as in Creatures bearing but one at a birth.

3. But long Bearing in the Womb maketh for Length of Life: three ways. First, for that the young one partakes more of the substance of the Mother, as hath been said. Secondly, that it comes forth more strong and able. Thirdly, that it undergoes the predatory force of the Air later. Besides, it shows that Nature intendeth to finish her periods by larger Circles. Thus, though Oxen and Sheep, which are born in the womb about six months, are but short-lived, that happens for other causes.

4. Feeders upon Grains and mere Herbs are but short-livers; and Creatures feeding upon Flesh, or Seeds, or Fruits, long-livers, as some Birds are. As for Harts, which are long-lived, they take the one half of their meat (as men use to say) from above their heads; and the Goose, besides Grains, findeth something in the water, and stubble to feed upon.

5. It is supposed that a good Cloathing of the Body maketh much to long life; for it fenneth and armeth against the incomparablenesses of the air, which do wonderfully assalit and decay the body: which benefit Birds especially have. Now that Sheep, which have so good Fleece, should be so short-lived, that it is imputed to Diseases, whereof that Creature is full, and to the bare eating of Grains.

6. The feast of the Spirits, without doubt, is principally the Head; which though it be usually understood of the Animal Spirits only, yet this is all in all. Again, it is not to be doubted but the Spirits do most of all waste and prey upon the Body, so that when they are either in greater plenty, or in greater Inflammation and Acrimony, there the life is much shortened. And therefore I conceive a great cause of long life in Birds to be the smallness of their Heads in comparison of their Bodies; for even Men which have very great Heads I suppose to be the short-lived.

7. I am of opinion that Carriage is of all other motions the most helpful to long life; which I also noted before. Now there are carried Water-fowls upon the Water, as Swans; all Birds in their flying, but with a strong endeavour of their limbs; and Fishes, of the length of which life we have no certainty.

8. Those Creatures which are long before they come to their perfection (not speaking of growth in stature only, but of other steps to maturity; as Man putteth forth, first, his Teeth, next the Signs of Puberty, then his beard, and so forward) are long-lived; for it shows that Nature finisheth her Periods by larger Circles.

9. Milder Creatures are not long-lived, as the Sheep and Dove; for Choler is as the waters and Spur to many Functions in the Body.

10. Creatures whose Flesh is more d酥isk as longer-lived than those that have white Flesh; for it showeth that the juice of the body is more firm, and less apt to displease. In every corruptible Body Quantity maketh much to the conservation of the whole: for a great Fire is longer in quenching, a small portion of it after is sooner evaporated, the Body of a Tree therewith not so fast a Screen. And therefore generally (I speak it of Species, not of Individuals) Creatures that are large in body are longer-lived than those that are small, unless there be some other potent cause to hinder it.
Nourishment ought to be of an inferior nature, and more simple substan-
tance than the thing nourished. Plants are nourished with the Earth and Water, 
Living Creatures with Plants, Men with living Creatures. There are also 
certain Creatures feeding upon Flesh, and Men himself takes Plants into 
a part of his Nourishment; but Men and Creatures feeding upon Flesh are scarcely no-
rished with Plants alone: perhaps Fruit or Grains, baked or boiled, may, with long 
use, nourish them; but Leaves or Plants or Herbs will not do so, as the Order of the Fo-
lintes showed by Experience.

Over-great Affinity or Confabulativeness of the Nourishment to the thing nourished 
proven not well: Creatures feeding upon Herbs touch no Flesh; and of Creatures 
feeding upon Flesh, few of them eat their own kind: As for Men, which are Cannibals, 
they feed not ordinarily upon Men flesh, but reserve it as a Dainty, either to serve 
their revenge upon their enemies, or to satisfy their appetite at some times. So the 
Ground is best lown with Seed growing elsewhere, and Men do not use to Graft or Ino-
uncate the same Stock.

By how much the more the Nourishment is better prepared, and approacheth nearer in 
likefaces to the thing nourished, by so much the more are Plants more fruitful, and living 
Creatures in better liking and plight: for a young Slip or Cion is not so well nourished 
if be pricked into the ground, as if it be grafted into a Stock agreeing with it in 
Nature, and where it finds the nourishment already digested and prepared: neither (as 
is reported, will the Seed of an Onion, or some such like, lown in the bare earth, bring 
forth so large a fruit as if it be put into another Onion, which is a new kind of Grafting, 
into the root, or under ground. Again, it hath been found out lately, that a Slip of a 
Wild Tree, as of an Elm, Oak, Ash, or such like, grafted into a Stock of the same kind, 
will bring forth larger leaves than those that grow without grafting: Also Men are not 
nourished so well with raw flesh as with that which hath passed the Fire.

Living Creatures are nourished by the Mouth, Plants by the Root. Young ones in 
the womb by the Navel: Birds for a while are nourished with the Yolk in the Egg, 
whereof some is found in their Crops after they are hatched.

All Nourishment moveth from the Centre to the Circumference, or from the Inward 
to the Outward: yet it is to be noted, that in Trees and Plants the Nourishment pal-
feth rather by the Bark and Outward parts then by the Pith and Inward parts; for if the 
Bark be pill'd off, though but for a small breadth, round, they live no more: and the 
Bland in the Veins of living Creatures doth no less nourish the Flesh beneath it then the 
Flesh above it.

In all Alimentation or Nourishment there is a two-fold Action, Extusion and At-
traction; whereof the former proceedes from the Inward Function, the latter from the 
Outward.

Vegetables assimulate their Nourishment simply, without Extreming: For Gums and 
Tears of Trees are rather Extremities then Excrements, and Knobs or knobs are nothing 
but Difeases. But the substance of living Creatures is more perceptible of the like; 
and therefore it is accompanied with a kind of disdain, whereby it rejecteth the bad, and 
assimilateth the good.

It is a strange thing of the flaky of Fruits, that all the Nourishment which produceth 
sometimes such great Fruits, should be forced to pass through so narrow necks; for the 
Fruit is never joyned to the Stock without some flaky.

It is to be noted, that the Seeds of living Creatures will not be fruitful but when they 
are new flaked, but the Seeds of Plants will be fruitful a long time after they are gathered; 
yet the Slips or Cions of Trees will not grow unless they be grafted green; neither will 
the roots keep long frith unless they be covered with earth.

In living Creatures there are degrees of Nourishment according to their Age: in the 
womb, the young one is nourished with the Mother's blood; when it is new-born, 
with Milk; afterwards with Meats and Drinks; and in old age the most nourishing and 
favory Meats please best.
The History of Life and Deaths.

Above all it maketh to the present Inquisition, to inquire diligently and attentively whether a man may not receive Nourishment from without, and some other way besides the Mouth. We know that Bats of Milk are used in some Helleck Fevers, and when the body is brought extreme low, and Physicians do provide Nourishing Ciclers. This matter would be well studied; for if Nourishment may be made either from without, or some other way than by the stomach, then the weakness of Concoction, which is incident to old men, might be recompenced by these helps, and Concoction restored to them intire.

Length and Shortness of Life in Man.

Before the Flood, as the Sacred Scriptures relate, Men lived many hundred years; yet none of the Fathers attained to a full thousand. Neither was this Length of Life peculiar only to Grace, or the Holy Line; for there are reckoned of the Fathers until the Flood eleven Generations; but of the sons of Adam by Cain only eight Generations; so as the pofterity of Cain may seem the longer-liv'd. But this Length of Life immediately after the Flood was reduced to a moiety, but in the Pofť-nat; for Noah, who was born before, equalled the age of his Ancestors, and Sem saw the six hundredth year of his life. Afterwards, three Generations being run from the Flood, the Life of Man was brought down to a fourth part of the primitive Age, that was, to about two hundred years.

Abraham lived an hundred seventy and five years: a man of an high courage, and prosperous in all things. Isaac came to an hundred and eighty years of age: a childish man, and enjoying more quietness than his Father. But Jacob, after many crosses and a numerous progeny, lasted to the hundred forty seventh year of his life: a patient, gentle, and wise man. Ismael, a military man, lived an hundred thirty and seven years. Sarah (whose years only amongst women are recorded) died in the hundred twenty seventh year of her age: a beautiful and magnanimous woman: a singular good Mother and Wife; and yet no less famous for her Liberty, than Obsequiousness towards her husband. Joseph also, a prudent and politick man, passing his youth in affliction, afterwards advanced to the height of honour and prosperity, lived an hundred and ten years. But his brother Levi, elder than himself, attained to an hundred thirty seven years: a man impatient of contumely and revengeful. Near unto the same age attained the son of Levi also his grandchild, the father of Aaron and Moses.

Moses lived an hundred and twenty years: a stout man, and yet the meekest upon the earth, and of a very slow tongue. Howsoever Moses in his Psalms pronounceth that the life of man is but seventy years; and if a man have strength, then eighty; which term of man's life standeth firm in many particulars even at this day. Aaron, who was three years the elder, died the same year with his Brother: a man of a ready speech, of a more facile disposition, and less constant. But Phineas, grandchild of Aaron, (perhaps out of extraordinary grace) may be collected to have lived three hundred years; if so be the War of the Israelites against the Tribe of Benjamin (in which Expedition Phineas was consulted with) were performed in the same order of time in which the History hath ranked it: He was a man of a most eminent Zeal. Joshua, a martial man, and an excellent Lover, and evermore victorious, lived to the hundred and tenth year of his life. Caleb was his Contemporary, and seemeth to have been of as great years. Ehud the Judge seems to have been no less than an hundred years old, in regard that after the Victory over the Moabites the Holy Land had rest under his Government eighty years: He was a man fierce and undaunted, and one that in a sort neglected his life for the good of his People.

Job lived, after the restitution of his happiness, an hundred and forty years, being before his afflictions of that age that he had sons at man's eftate: a man politic.
The History of Life and Death.

litick, eloquent, charitable, and the Example of Patience. Eli the Priest lived ninety eight years; a corpulent man, calm of disposition, and indulgent to his children. But 
Ezrains the prophet may seem to have died when he was above an hundred years old; for he is found to have lived after the assumption of Elias fifty years; and at the time of that assumption he was of those years, that the boys mocked him by the name of 
Bald-head: a man vehement and severe, and of an aulterie life, and a conserver of riches. Also 
Isaiah the prophet seemeth to have been an hundred years old: for he is found to have exercised the Function of a Prophet seventy years together, the years both of his beginning to prophesie and of his death being uncertain; a man of admirable eloquence, an Evangelical Prophet, full of the promises of God of the New Testament, as a Bottle with sweet Wine.

Tobias the Elder lived an hundred fifty eight years, the Younger, an hundred twenty seven: merciful men, and great alms-givers. It seems, in the time of the 
Captivity, many of the Jews who returned out of Babylon were of great years, seeing they could remember both Temples, (there being no less than seventy years between them) and went for the unlikenesse of them. Many ages after that, in the time of our Saviour, lived old Simon, to the age of ninety, a devout man, and full both of hope and expection.

Into the same time also fell Apan the Prophetess, who could not possibly be less than an hundred years old; for she had been seven years a wife, about eighty four years a widow, besides the years of her virginity, and the time that she lived after her Prophecy of our Saviour: She was an holy woman, and passed her days in fasting and prayers.

The long Lives of Men mentioned in Heathen Authors have no great certainty in them; both for the intermixture of Fables, whereunto those kind of relations were very prone, and for their false calculation of years. Certainly the Egyptians we find nothing of moment in those works that are extant as touching long life, for their Kings which reigned longest did not exceed fifty or five and fifty years, which is no great matter, seeing many at this day attain to those years. But the Arcadian Kings are fabulously reported to have lived very long. Surely that Country was Mountainous, full of flocks of Sheep, and brought forth most wholesome food; notwithstanding, seeing Pan was their god, we may conceive that all things about them were Peaceful and vain, and subject to fables.

Numa King of the Romans lived to eighty years: a man peaceable, contemplative, and much devoted to Religion. Marcus Valerius Corvinus saw an hundred years complete, there being between his first and six hundred sixty six years: a man valorous, affable, popular, and always fortunate.

Silen of Athens, the Law giver, and one of the seven Wise men lived above eighty years: a man of an high courage, but popular, and affected to his Country; also learned, given to pleasures and a soft kind of life. Epimenides the Cretian is reported to have lived an hundred fifty seven years: the matter is mix'd with a prodigious Relation; for fifty seven of those years he is said to have slept in a Cave. Half an age after Xenophon the Colophonian lived an hundred and two years, or rather more: for at the age of twenty five years he left his Country, seventy seven complete years he travelled, and after that returned; but how long he lived after his return appears not; a man no less wandering in mind than in body, for his name was changed for the madnese of his opinions from Xenophanes to Xenomuses: a man no doubt of a vait conceit, and that minded nothing but Infinitum.

Anacreon the Poet lived eighty years and somewhat better: a man lascivious, voluptuous, and given to drink. Pindarus the Theban lived to eighty years: a Poet of an high fancy, singular in his conceits, and a great adorer of the god. Sophocles the Athenian attained to the like age: a lofty Tragick Poet, given over wholly to Writing, and neglectful of his Family.

Aratus King of Perseus lived ninety four years: a man of a dull wit, averse to the dispatch of business, desirous of glory, but rather of ease. At the same time lived Agesilaus King of Sparta to eighty four years of age: a moderate Prince, as being a Philosopher among Kings; but notwise flanding ambitious, and a Warrirour, and no less wont in war than in business.

Gorgias the Sicilian was an hundred and eight years old: a Rhetorician, and a great boaster of his faculty, one that taught Youth for profit: he had seen many Countries,
Countries, and a little before his death said, That he had done nothing worthy of blame since he was an old man. Protagons of Africa was ninety years of age: this man was likewise a Rhetorician, but professed not so much to teach the Liberal Arts, as the Art of Governing Common-wealths and States: notwithstanding he was a great wanderer in the world, no less than Gorgias. Inocrates the Athenian lived ninety eight years: he was a Rhetorician also, but an exceeding modest man; one that shunned the publick light, and opened his School only in his own house. Democracy of Africa reached to an hundred and nine years: he was a great Philosopher, and, if ever any man amongst the Greeks, a true Naturalist; a Surveyor of many Countries, but much more of Nature; also a diligent searcher into Experiments, and (as Aristotle objected against him) one that followed Similitudes more than the Laws of Arguments. Diogenes the Sisoean lived ninety years: a man that used liberty towards others, but tyranny over himself: a coarse diet, and of much patience. Zeno of Citium lacked but two years of an hundred: a man of an high mind, and a contemner of other men's opinions; also of a great acuteness, but yet not troublesome, choosing rather to take men's minds than to enforce them: The like whereof afterward was in Seneca. Plato the Athenian attained to eighty one years: a man of a great courage, but yet a lover of ease; in his Notions sublimed, and of a fancy, neat and delicate in his life, rather calm than merry, and one that carried a kind of Majesty in his countenance. Theophrastus the Cretian arrived at eig' ty five years of age; a man sweet for his eloquence, sweet for the variety of his matters, and who felectcd the pefliant things of Philosophy, and let the bitter and harsh go. Carneades of Cyrene many years after came to the like age of eighty five years: a man of a fluent eloquence, and one who by the acceptable and pleasant variety of his knowledge delighted both himself and others. But Orbilius, who lived in Cicero's time, no Philosopher or Rhetorician, but a Grammarian, attained to an hundred years of age, he was first a Soldier, then a Schoolmaster; a man by nature tart both in his Tongue and Pen, and severe towards his Scholars.

12. Quintus Fabius Maximus was August sixty three years, which shewed him to be above eighty years of age at his death; though it be true, that in the Augustan Nobility was more respected then age: a wise man, and a great Deliberator, and in all his proceedings moderate, and not without affability severe. M. Antonia King of Numidia lived ninety years, and being more than eighty five got a son: a daring man, and trusting upon his fortune, who in his youth had tafted of the inconstancy of Fortune but in his succeeding age was constantly happy. But Marcus Porcius Cato lived above ninety years of age: a man of an Iron body and mind; he had a bitternes, and loved to cherish factions; he was given to Husbandry, and was to himself and his Family a Physician.

13. Terentia Cicero's wife, lived an hundred and three years: a woman afflicted with many crofles; first, with the banishment of her Husband; then with the difference between them; lastly, with his late fatal misfortunes: She was also oftentimes vexed with the Gout. Lucina must needs exceed an hundred by many years; for it is said that she acted an whole hundred years upon the Stage, at first perhaps representing the person of some young Girl, at last of some decrepit old Woman. But Galeria Copeola, a Player also and a Dancer, was brought upon the Stage as a Novice, in what year of her age is not known; but ninety nine years after, at the Dedication of the Theatre by Pompey the Great, she was shewn upon the Stage, not now for an Actres, but for a Wonder: neither was this all, for after that, in the Summertime for the health and life of Augustus, she was shewn upon the Stage the third time.

14. There was another Actres, somewhat inferior in age, but much superior in dignity, which lived well-near ninety years, I mean Livia Julia August, wife to Augustus Caesar, and mother to Tiberius. For if Augustus his life were a Play, (as himself would have it, whenas upon his death-bed he charged his friends they should give him a Pantomime after he was dead) certainly this Lady was an excellent Actres, who could carry it so well with her husband by a dissemble obedience, and with her son by power and authority: a woman affable, and yet of a Mostal carriage, pragmatical, and upholding her power. But Junia, the wife of Caius Caius, and foster of Marcus Brutus, was also ninety years old; for she survived the Philippick Battle sixty four years: a magnificent woman, in her great wealth

happy:
happy in the calamity of her husband and near kinsfolks, and in a long widow-head unhappy; notwithstanding much honoured of all.

The year of our Lord seventy six, falling into the time of Vespasian, is memorable; in which we shall find, as it were, a calendar of long-lived men: For that year there was a Taxing, (now is the most Authentical and trust Informer touching the ages of men;) and in that part of Italy which lieth betwixt the Apennine Mountains and the River Po, there were found an hundred and four and twenty persons that either equalled or exceeded an hundred years of age; namely, of an hundred years just, fifty four persons; of an hundred and ten, fifty seven persons; of an hundred and five and twenty, two only; of an hundred and thirty, four men; of an hundred and five and thirty, or seven and thirty, four more; of an hundred and forty, three men. Besides thefe, Parmain particular afforded five; whereof three fulfilled an hundred and twenty years, and two an hundred and thirty; bruxells afforded one of an hundred and twenty five years old; Placentia one, aged an hundred and thirty and one: Placentia one woman, aged one hundred thirty and two: a certain Town, then called Villestium, situate in the Hills about Placentia, afforded ten, whereof six fulfilled an hundred and ten years of age; four, an hundred and twenty; Lastly, Rimini one of an hundred and fifty years, whose name was Marcus Apionis.

That our catalogue might not be extended too much in length, we have thought fit; as well in those whom we have rehearsed, as in those whom we shall rehearse, to offer none under eighty years of age. Now we have affixed to every one a true and short Character or Elogv; but of that part whereunto, in our judgment, Length of Life (which is not a little subject to the Stumers and Fortunes of men) hath some relation, and that in a two-fold respect: either that such kind of men are for the most part longlived; or that such men may sometimes be of long life, though otherwise not well disposed for it.

Amongst the Roman and Grecian Emperors, also the French and Amanis, to thefethedays, which make up the number of well-near two hundred princes, there are only four found that lived to eighty years of age: unto whom we may add the two first Emperors, Augustus and Tiberius; whereof the latter fulfilled the seventy and eighth year, the former the seventy and sixth year of his age, and might both perhaps have lived to fourscore, if Livia and Caius had been pleased. Augustus (as was said) lived seventy and six years: a man of moderate disposition; in accomplishing his designs vehement; but otherwife calm and serene; in meat and drink sober, in Venery temperate, through all his life-time happy; and who about the thirtieth year of his life had a great and dangerous sickness, inomuch as they despaired of his life in him; whom Antonius Mys the Physician, when other Physicians had applied hot Medicines, as most agreeable to his disease, on the contrar cured with cold Medicines, which perchance might be some help to the prolonging of his life, tiberius lived to be two years older: A man with lean chaps, as Augustus was wont to say, for his speech stuck within his jaws, but was weighty. He was bloody, a drinker, and one that took Luft into a part of his diet: notwithstanding a great observer of his health, inomuch that he used to say, That he was a fool that after thirty years off age took advice of a phyfician. Gordian the elder lived eighty years: and yet died a violent death when he was scarce warm in his Empire: a man of an high spirit and renowned, learned, and a Poet; and constantly happy throughout the whole course of his life, save only that he ended his days by a violent death. Valerian the Emperor was seventy six years of age before he was taken prisoner by Supor King of Persia, after his Captivity he lived seven years in reproaches, and then died a violent death also: a man of a poor mind, and not valiant; notwithstanding pitched up in his own and the opinion of men, but falling short in the performance. Anaxagoras, surnamed Didicus, lived eighty eight years: he was of a fettle mind, but too abject, and superfluous, and fearful. Anecus Justi- nianus lived to eighty three years: a man greedy of glory, performing nothing in his own person, but in the value of his Captains happy and renowned; luxurious; and not his own man, but suffering others to lead him. Helena of Bithynia, mother of Constantine the Great, was fourscore years old: a woman that intermeddled not in matters of State neither in her Husband's nor son's Reign, but devoted her self wholly to Religion; magnanimous, and perpetually flourishing. Theodora the Empress (who was fitter to Zeus, wife
wife of Monomachus, and reigned alone after her decease) lived above eighty years: a pragmatical woman, and one that took delight in Governing; fortunate in the highest degree, and through her good fortunes credulous.

We will proceed now from these Secular Princes to the Princes in the Church. St. John, an Apostle of our Saviour, and the Beloved Disciple, lived ninety three years. He was rightly denoted under the Emblem of the Eagle, for his piercing sight into the Divinity; and was a Seraph amongst the Apostles in respect of his burning Love. St. Luke the Evangelist fulfilled fourscore and four years: an eloquent man, and a Traveller, St. Paul's inexpressible Companion, and a Physician. Simon the Son of Cleophas, called the Brother of our Lord, and Bishop of Jerusalem, lived an hundred and twenty years though he was cut short by Martyrdom: a stout man, and constant, and full of good works. Polycarpus, Disciple unto the Apostles, and Bishop of Smyrna, femeath to have extended his age to an hundred years and more; though he were also cut off by Martyrdom: a man of an high mind, of an heroic patience, and unwearied with labours. Dyonisius Areopagita, Contemporany to the Apostle St. Paul, lived ninety years: he was called the bird of Heaven for his high flying Divinity, and was famous as well for his holy life as for his Meditations. Aquilla and Priscilla, first St. Paul the Apostle's Hofs. Afterward his Fellow helpers, lived together in a happy and famous Wedlock at least to an hundred years of age a piece; for they were both alive under Pope Nifus the first: a noble Pair, and prone to all kind of charity, who amongst other their comforts (which no doubt were great unto the first Founders of the Church) had this added, to enjoy each other so long in an happy marriage. St. Paul the Vermeil lived an hundred and thirteen years: now he lived in a Cave; his diet was so slender and strict, that it was thought almost impossible to support humane nature therewith: he passed his years only in Meditations and Sighs: yet he was not illet-erate or an Idiot, but learned. St. Anthony, the first Founder of Monks, or (as some will have it) the Restorer once, attained to an hundred and five years of age: a man devout and contemplative, though not unfit for Civil affairs: his life was austere and mortifying; notwithstanding he lived in a kind of glorious solitude; and exercised a command, for he had his Monks under him. And besides, many Christians and Philosophers came to visit him as a living Image, from which they parted not without some adoration. St. Athanasius exceeded the term of eighty years: a man of an invincible constancy, commanding fame, and not yielding to Fortune: he was free towards the Great ones, with the People gracious and acceptable, beaten and practised to oppositions, and in delivering himself from them stout and wife. St. Hierom, by the consent of most Writers, exceeded ninety years of age: a man powerful in his Pen, and of a manly Eloquence, variously learned both in the Tongues and Sciences, also a Traveller, and that lived strictly towards his old age, in an estate private, and not dignified; he bore high Spirits, and shined far out of obscurity.

The Popes of Rome are in number to this day two hundred and one. Of so great a number five only have attained to the age of fourscore years, or upwards. But in many of the first Popes their full age was intercepted by the Prerogative and Crown of Martyrdom. John the twenty third, Pope of Rome, fulfilled the ninetieth year of his age: a man of an unquiet disposition, and one that studied novelty: he altered many things, some to the better, others only to the new, a great accumulator of Riches and Treasures. Gregory, called the twelfth, created in Schism, and not fully acknowledged Pope, died at ninety years: of him, in respect of his short Papacy, we find nothing to make a judgment upon. Paul the third lived eighty years and one: a temperate man, and of a profound wisdom: he was Learned, an Astrologer, and one that tended his health carefully; but, after the example of old Elisha, over-indulgent to his Family. Paul the fourth attained to the age of eighty three years: a man of an harsh nature and severe, of an haughty mind and imperious, prone to anger; his speech was eloquent and ready. Gregory the thirteenth fulfilled the like age of eighty three years: an absolute good man, found in mind and body, politic, temperate, full of good works, and an alms-giver.

Those that follow are to be more promiscuous in their order, more doubtful in their faith, and more barren of observation. King Arganthenus, who reigned at Cadiz in Spain.
Spain lived an hundred and thirty, or (as some would have it) an hundred and forty years, of which he reigned eighty. Concerning his Manners, Institution of his Life, and the time wherein he reigned, there is a general silence. Cyprian King of Cyprus, living in the island then termed the Happy and Pleasant Island, is affirmed to have attained to an hundred and fifty or sixty years. Two Latin Kings in Italy, the Father and the Son, are reported to have lived, the one eight hundred, the other six hundred years: but this is delivered unto us by certain Plutarchists, who though otherwise credulous enough, yet themselves have suspected the truth of this matter, or rather condemned it. Others record some Arcadian Kings to have lived three hundred years: the Country, no doubt, is a place apt for long life; but the Relation I suspect to be fabulous. They tell of one Dandis in Illyrisum, that lived without the inconveniences of old age to five hundred years. They tell also of the Epiants, a part of Colchis, that the whole Nation of them were exceeding long liv'd, infomuch that many of them were two hundred years old: and that one principal man amongst them, named Amoris, a man of a Giant-like stature, could have told three hundred years. It is recorded, that on the top of the Mountain Timolus, anciently called Tempi, many of the Inhabitants lived to an hundred and fifty years. We read that the Soil of the Elitsans amongst the few did usually extend their life to an hundred years: Now that Soil used a single or abstemious diet, after the rule of Pythagoras. Apollonius Tyaneus exceeded an hundred years, his face bewraying no such age: he was an admirable man, of the Academi reputed to have something Divine in him, of the Christians held for a Sorcerer; in his diet Pythagorical, a great traveller, much renowned, and by some adored as a god: notwithstanding, towards the end of his life he was subject to many complaints against him, and reproaches, all which he made shift to escape. But left his long life should be imputed to his Pythagorical diet, and not rather that it was hereditary, his Grandfather before him lived an hundred and thirty years. It is undoubted that Quintus Metellus lived above an hundred years, and that after several Confulships happily administered, in his old age he was made Pontifex Maximus, and exercised those holy duties full two and twenty years; in the performance of which Rites his voice never failed, nor his hand trembled. It is most certain that Appius Caecus was very old, but his years are not extant, the most part whereof he passed after he was blind; yet this misfortune no whit softened him, but that he was able to govern a numerous Family, a great Retinue and Dependence, yea, even the Commonwealth is self, with great stoutness. In his extreme old age he was brought in a Litter into the Senate-houses, and vehemently dissuaded the Peace with Pyrrhus: the beginning of his Oration was very memorable, thewning an invincible spirit and strength of mind: I have with great grief of mind (Fathers conscript) these many years born my blindnes, but now I could wish that I were itself also, when I hear you speak to such disadvantageable Treaties. Marcus Perpenna lived ninety eight years, surviving all those whole Suffrages he had gathered in the Senate-houses, being consul, I mean, all the Senators at that time; as also those whom a little after, being consull, he chose into the Senate, seven only being excepted. Hiero King of Sicily, in the time of the second Punic War, lived almost an hundred years: a man moderate both in his Government and in his Life; a worther of the gods, and a religious conserver of Friendship: liberal, and constantly fortunate. Scipio, defenced of a noble Family in the days of Claudius, lived ninety nine years. Eunice, the daughter of Olym, an hundred and fifteen. Xerxes, an ancient Philosopher, of the Sect of Pythagoras, attained to an hundred and six years, remaining healthful and vigorous in his old age, and famous amongst the vulgar for his learning. The宣扬s of Corypha were anciently accounted long liv'd, but now they live after the rate of other men, Hypocrates Cons, the famous Physician, lived an hundred and four years, and approved and credied his own Art by so long a life: a man that coupled Learning and Wildom together, very conversant in Experience and Observation; one that haunted not after Words or Methods, butpherred the very Nerves of Science, and so propounded them. Democritus a Philosopher, not only in Profession but Practice, lived in the days of Adrian almost to an hundred years: a man of an high mind, and a vanquisher of his own mind, and that truly and without affection; a contemner of the world, and yet civil and courteous. When his friends spake to him about his Burial, he said, Take no care for my Burial, for Stench will bury a Carcass. They replied, It is your
mind than to be cast out to Birds and Dogs? He said again, Seeing in my life-time I endeavoured to my uttermost to benefit Men, what hurt is it if when I am dead I benefit Beasts? Certain Indian People called Pandare are exceedingly long-liv'd, even to no less than two hundred years. They add a thing more marvellous, That having, when they are boys, an hair somewhat whitish, in their old age, before their gray hairs, they grow coal black, though indeed this be every where to be feen, that they which have white hair whilfe they are boys, in their man's estate change their hairs into a darker colour. The Seres, another people of India, with their Wine of Palms are accounted long live's, even to an hundred and thirty years. Emphasor the Grammarian grew old in his School, and taught Scholars when he was above an hundred years old. The elder Ovid, father to the Poet, lived ninety years, differing much from the disposition of his son, for he contemned the Muses, and dissuaded his son from Poetry. Anianus Pollio, intimate with Augustus, exceeded the age of an hundred years: a man of an unreasonable Profuence, Eloquent, and a lover of Learning; but vehement, proud, cruel, and one that made his private ends the centre of his thoughts. There was an opinion, that Seneca was an extreme old man, no less than an hundred and fourteen years of age: which could not possibly be, it being as improbable that a decrepit old man should be set over Nero's Youth, as, on the contrary, it was true, that he was able to manage with great dexterity the affairs of State: besides, a little before, in the midst of Claudins his Reign, he was banished Rome for Adulteries committed with some Noble Ladies, which was a Crime no way compatible with so extreme old age. Johannes de Temporiibus, among all the men of our latter Ages, out of a common fame and vulgar opinion, was reputed long-liv'd, even to a miracle, or rather, even to a fable; his age hath been counted above three hundred years: He was by Nation a French-man, and followed the Wars under Charls the Great. Gervias Aurein, Great Grand-father to Petrarch, arrived at the age of an hundred and four years: he had ever enjoyed the benefit of good health; besides, at the laft, he felt rather a decay of his strength, than any sickness or malady, which is the true Revolution by old age. Amongst the Venetians there have been found not a few long live's, and those of the more eminent sort: Franciscus Donatus, Duke; Thomas Contarinus, Procurator of St. Mark; Franciscus Melinus, Procurator also of St. Mark, and others. But most memorable is that of Cornaroa the Venetian, who being in his youth of a sickly body, began first to eat and drink by measure to a certain weight, thereby to recover his health: this Cure turned by use into a Diet, that Diet to an extraordinary long Life, even of an hundred years and better, without any decay in his fenes, and with a constant enjoying of his health. In our age William Polet, a French-man, lived to an hundred and well-nigh twenty years, the top of his head on the upper-lip being black, and not gray at all: a man crazed in his brain, and of a fancy not altogether found: a great Traveller, Mathematician, and somewhat flained with Heresie.

I fuppofe there is scarce a Village with us in England, if it be any whit populous, but it affords some Man or Woman of fourscore years of age: nay, a few years since there was in the County of Hereford a May-game or Morrice dance, confenting of eight men, whose age computed together made up eight hundred years; insomuch that what some of them wanted of an hundred, others exceeded as much.

In the Hospital of Bethlehem, corruptly called Bedlam, in the Suburbs of London, there are found from time to time many mad perfons that live to a great age.

The ages of nymphs, fauns, and satyrs, whom they make to be indeed mortal, but yet exceedingly long-liv'd, (a thing which ancient Superfition and the late Credulity of some have admitted:) we account but for fables and dreams; especially being that which hath neither conneft with philosophy nor with divinity. And as touching the History of Long Life in Man by Individuals, or next unto Individuals, thus much. Now we will pass on to Observations by certain Heads.

The Running on of Ages, and Succession of Generations, seem to have no wit abated from the length of Life; for we fee that from the time of Muffs unto these our days, the term of man's life hath flood about fourscore years of age, neither hath it declined (as a man would have thought) by little and little. No doubt there are times in every Country wherein men are longer or shorter liv'd.
The History of Life and Death.

Longer, for the most part when the times are barbarous, and men fare less deliciously, and are more given to bodily exercises: Shorter, when the times are more civil, and men abandon themselves to luxury and ease. But these things pass on by their turns, the succession of Generations ater is not. The same, no doubt, is in other living Creatures: for neither Oxen, nor Horses, nor Sheep, nor any the like, are abridged of their wonded ages at this day. And therefore the Great Abridger of Age was the Flood; and perhaps some such notable accidents (as particular Inundations, long Droughts, Earthquakes, or the like) may do the same again. And the like reason is in the dimension and stature of Bodies; for neither are they lessened by succession of Generations, howsoever Virgil (following the vulgar opinion) divined, that after Ages would bring forth leffer Bodies than the then present; whereupon speaking of ploughing up the Amathian and Amonian Fields, he faith, Grandign; effoffis mmhabitur offa sepulchris, That after ages shall admire the great bones dugged up in ancient sepulchres. For whereas it is manifested that there were heretofore men of Gigantine Statures, (such as for certain have been found in Sicily, and else-where, in ancient Sepulchres and Caves) yet within those last three thousand years, a time whereof we have sure memory, those very places have produced none such: although this thing also hath certain turns and changes, by the Civilizing of a Nation, no less than the former. And this is the rather to be noted, because men are wholly carried away with an opinion, that there is a continual decay by Succession of Ages, as well in the term of man's Life as in the stature and strength of his Body; and that all things decline and change to the worse.

In Cold and Northern Countries men live longer commonly than in Hot: which must needs be in respect the skin is more compact and close, and the juices of the body less diffipable, and the Spirits themselves less eager to consume, and in better disposition to repair, and the Air (as being little heated by the Sun-beams) less pernicious: And yet under the Equinoctial Line, where the Sun paffeth to and fro, and causeth a double Summer and double Winter, and where the Days and Nights are more equal, (if other things be concurring) they live also very long; as in Peru and Taprobane.

Islanders are, for the most part, longer-liv'd than those that live in Continents: for they live not so long in Russia as in the Orcaides; nor so long in Africa, though under the same Parallel, as in the Canaries and Tercera's; and the Laplanders are longer-liv'd than the Chinese, though the Chinese are made up long life. And this thing is no marvel, seeing the Air of the Sea doth heat and cherish, in cooler Regions, and cool in hotter.

High Situations do rather afford long-livers than Low, especially if they be not Tops of Mountains, but Rising Grounds, as to their general Situations; such as was Arcadia in Greece, and that part of Etolia where we related them to have lived so long. Now there would be the same reason for Mountains themselves, because of the pureness and clearness of the Air, but that they are corrupted by accident, namely, by the Vapours rising thither out of the Valleys, and resting there; and therefore in Snowy Mountains there is not found any notable long life, not in the Alps, not in the Pyrenean Mountains, nor in the Apennines: yet in the tops of the Mountains running along towards Ethiopia and the Abyssines, where by reason of the Sands beneath little or no Vapour refeth to the Mountains, they live long, even at this very day, attending many times to an hundred and fifty years.

Merchants and Feast are propitious to the Natives, and malignant to Strangers, as touch- ing the lengthening and shortening of their lives: and that which may seem more marvelous, Salt-Merchants, where the Sea Ebb and Flows, are of less wholesome than those of Fresh-water.

The Countries which have been observed to produce long-livers are these; Arcadia, Etolia, India on this side Ganges, Krafil, Taprobane, Britain, Ireland, with the Islands of the Orcaides and Hebrides: for as for Ethiopia, which by one of the Ancients is reported to bring forth long Livers, thisbutatoy.

It is a Secret; The healthfulness of Air, especially in any perfection, is better found by Experiment than by Discourse or Conjecture. You may make a trial by a lock of Wool exposed for a few days in the open Air, if the weight be not much increased.
increased; another by a piece of flesh exposed likewise, if it corrupt not over-soon; another by a Weather-glass, if the Water interchange not too suddenly. Of these and the like enquire further.

Not only the Goodness or Purity of the Air, but also the Equality of the Air, is material to long life. Intermixture of Hills and Dales is pleasant to the sight, but suspected for long life. A Plain, moderately dry, but yet not over-barren or sandy, nor altogether without Trees and Shade, is very convenient for length of life.

Inequality of Air (as was even now said) in the place of our dwelling is naught, but Change of Air by travelling, after one be used unto it, is good; and therefore great Travellers have been long liv'd. Also those that have lived perpetually in a little cottage, in the same place, have been long-livers: for air accustomed consumeth less; but air changed nouriseth and repaireth more.

As the continuation and number of Successions (which we said before) makes nothing to the Length and Shortness of Life; so the immediate condition of the Parents, (as well the Father as the Mother) without doubt availeth much. For some are born of old men, some of young men, some of men of middle age; again, some are begotten of fathers healthful and well-disposed, others of diseased and languishing; again, some of fathers immediately after repose, or when they are drunk, others after sleeping, or in the morning; again, some after a long intermission of Venus, others upon the act repeated; again, some in the fervency of the father's love, (as it is commonly in Baffards,) others after the cooling of it, as in long married couples. The same things may be considered on the part of the Mother: unto which must be added the condition of the Mother, whilst she is with child, as touching her health, as touching her diet, the time of her bearing in the womb, to the tenth month, or earlier. To reduce these things to a Rule, how far they may concern Long Life, is hard; and so much the harder, for that those things which a man would conceive to be the best, will fall out to the contrary: For that alacrity in the Generation which begets lusty and lively children, will be less profitable to long life, because of the Acrimony and inflaming of the Spirits. We said before, That to partake more of the mother's blood condueth to long life; also we suppose all things in moderation to be best; rather Conjugal love than Meretricious; the hour for Generation to be the morning; a state of body not too lusty or full, and such like. It ought to be well observed, that a strong Constitution in the Parents is rather good for them then for the Child, especially in the Mother: And therefore Plato thought, ignorantly enough, that the virtue of Generations hasted, because the Woman used not the same exercise both of mind and body with the Men. The contrary is rather true; for the difference of virtue betwixt the Male and the Female is most profitable for the Child; and the thinner Women yield more towards the nourishment of the Child; which also holds in Nurseries. Neither did the Spartan Women, which married not before twenty two, or, as some say, twenty five, (and therefore were called Man-like women) bring forth a more generous or long-liv'd Progeny than the Roman or Athenian, or Theban women did, which were ripe for Marriage at twelve or fourteen years; and if there were any thing eminent in the Spartans, that was rather to be imputed to the Purgance of their Diet than to the late Marriages of their Women. But this we are taught by experience, that there are some Races which are long liv'd for a few Defects; so that Life is like some Diseases, a thing hereditary within certain bounds.

Fair in Face, or Skin, or Hair, are shorter livers; Black, or Red, or Freckled, longer. Also too fresh a colour in Youth doth less promise long life than paleness. A hard skin is a sign of long life rather than a soft; but we understand not this of a rough skin, such as they call the Goose skin, which is as it were spongy, but of that which is hard and close. A Forehead with deep furrows and wrinkes is a better sign than a smooth and plain Forehead.

The Hair of the Head hard and like bristles, do betoken longer life than those that are soft and delicate. Curled Hair betoken the same thing, if they be hard withal; but the contrary if they be soft and shining: the like if the curling be rather thick than in large bunches.

Early or late Baldness is an indifferent thing, seeing many which have been Bald.
The History of Life and Deaths.

bald betimes have lived long. Also early gray hairs (howsoever they may seem forerunners of old age approaching) are no true signs; for many that have grown gray betimes have lived to great years: nay, hasty gray hairs without baldness is a token of long life; contrarily, if they be accompanied with baldness.

Hairiness of the upper parts is a sign of short life and they that have extraordinary much hair on their breasts live not long: but hairiness of the lower parts, as of the Thighs and Legs, is a sign of long life.

Hairiness of Stature (if it be not immoderate) with convenient making, and not too flanger, especially if the body be active withal, is a sign of long life: Also on the contrary, men of low stature live long, if they be not too active and flanging.

In the proportion of the body, they which are short to the wrists, with long Legs, are longer liv'd than they which are long to the wrists, and have short Legs: Also they which are large in the weather parts, and straight in the upper, (the making of their body rising, as it were, into a sharp figure) are longer liv'd than they have broad shoulders, and are slender downwards.

Leanness, where the affections are feebled, calm, and peaceable; also a more fat habit of body, joyed with Choler, and a disposition flanging and peremptory, signify long life: but Corpulence in Youth foreshews short life, in Age it is a thing more indifferent.

To be long and slow in growing is a sign of long life: if to a greater stature, the greater sign, if to a lesser stature, yet a sign though; contrarily, to grow quickly to a great stature is an evil sign; if to a small stature, the less evil.

Eyes Flies, a raw bone body, and veins lying higher than the flesh, betoken long life; the contrary to thefe, short life.

A Head somewhat larger than to the proportion of the body; a moderate Neck, not long, nor flanger, nor fat, nor too short; wide Nostrils, whatsoever the form of the Nose be; a large Mouth; and Ear gruffly, not fleey; Teeth strong and contiguous, small, or thin, fit, foretoken long life; and much more it is seen new Teeth put forth in our elder years.

A broad Breast, yet not bearing out, but rather bending inwards; Shoulders some what creoked, and (as they call such persons) round-back'd; a flat Belly; a thinlarge, and with few lines in the Palm; a short and round Foot, Thighs not fleey, and almost of the Legs not hanging over, but next, are signs of long life.

Eyes somewhat large, and the circles of them inclined to greenness; senses not too quick; the Puffe in youth flower, towards old age quicker; Faculty of holding the breath, and longer than usual; the body in youth inclined to be bound, in the decline of years more laxative, are also signs of long life.

Concerning the Times of Nature, as they refer to long life, nothing hath been observed worthy the setting down. Save only Anthropological Observations, which we rejected in our Quicks. A Birth at the eighth month is not only long liv'd, but not likely to live. Also it is never births are accounted the longer liv'd.

A Pythagorical or Monastic Diet, according to strict rules, and always exactly equal, (as that of Ortnas was) seemeth to be very effectual for long Life. Yet on the contrary, amongst those that live freely and after the common sort, such as have good famothe, and feed more plentifully, are often the longest liv'd. The middle diet, which we account the temperate, is commended, and conduceth to good health, but not to long life: for the spare diet begets few Spirits, and dull, and so wasteth the body less; and the liberal diet yieldeth more ample nourishment, and so repareth more: but the middle diet doth neither of both, for where the Extremes are hurtful, there the Mean is best; but where the Extremes are helpful, there the Mean is nothing worth.

Now to that spare diet there are requisite Watchings: Left the Spirits being few should be oppressed with much sleep; little Exercises, lest they should exhale; obliqueness from Venus, lest they should be exhausted: but to the liberal diet, on the other side, are requisite much Sleep, frequent Exercises, and a reasonable use of Venus. "Bars and Asmonitories (such as were ancienly in use) did rather tend to deliciouseth than to prolonging of life. But of all these things we shall speak more exactly when we come to the Inquisition according to Intentions. Mean while that of celsian, who was not only a learned Physician, but a wise man, is not to be omitted, who advieth interchanging and alternation of the diet, but still with an inclination to the more benign: as that a man should sometimes accustom himself to watching,
The History of Life and Death.

watching, sometimes to sleep; but to sleep oftneft: again, that he should sometimes give himself to futting, sometimes to fefling; but to fefling oftneft: that he should sometimes inure himself to great labours of the mind, sometimes to relaxations of the fame; but to relaxations oftneft. Certainly this is without all question, that Diet well ordered bears the greatest part in the prolongation of life: neither did I ever meet an extrem long-liv'd man, but being asked of his cuflome, he obferved fomething peculiar; fome one thing, fome another. I remember an old man, above an hundred years of age, who was produced as witness touching an ancient Prefcription. When he had finifhed his testimony the Judge familiarly asked him how he came to live fo long. He anfwered, befitde expectation, and not without the laughter of the hearers, by eating before I was hungry, and drinking before I was dry. But of these things we shall speak hereafter.

47. A life led in Religion and in Holy Exercises feemeth to conduct to long life. There are in this kind of life these things, Leisure, Admiration and Contemplation of heavenly things. Joyes not fenfual, noble hopes, wholesome Fear, sweet Sorrows; latelly, continual Renovations by Observances, Penances, Expiations: all which are very powerful to the prolongation of life. Unto which if you add that you ferfe diet which hardndh the mafl of the Body, and humbleth the Spirits, no marvel if an extraordinary length of life do follow; fuch was that of Paul the Hermit, Simeon Seldita the Coloninar Anchorite, and of many other Hermits and Anchorites.

48. Next unto this is the life led in good Letters, fuch as was that of Philosophers, Rhetoricians, Grammarians. This life is alfo led in leisure; and in those thoughts, which, seeing they are severed from the affairs of the world, bite not, but rather delight through their Variety and Impertinencie: They live alfo at their pleasure, spending their time in fuch things as like them best, and for the most part in the company of young men, which is ever the most charming. But in Philosophies there is great difference betwixt the Sefts as touching long life: For fome Philosophies which have in them a touch of Superflition, and are converfant in high Contemplations, are the beft: as the Pythagorical and Platonick: alfo fome which did inftitu a perambulation of the world, and confidered the variety of natural things, and had reachles, and high, and magnanmious thoughts, (as of Infiniuit, of the Stars, of the Heroical Vertues, and fuchlike) were good for lengthening of life; fuch were fome of Democritus Philolus, Xenophanes, the Altruogions and Stoicks: alfo fome which had no profound Speculation in them, but difcourfed calmly on both sides, out of common Sense, and therefore received Opinions, without any Sharp Inquisitions, were like wife good; fuch were fome of Carneades and the Academicks, alfo of the Rhetoricians and Grammarians. But contrary, Philosophies converfant in perplexing Subtilties, and which pronounced peremptorily, and which examined and wrested all things to the Scale of Principles, lastly, which were thorny and narrow, were evil: fuch were fome commonly of the Peripatetick, and of the Schoolmen.

49. The Country life alfo is well fitted for long life: it is much abroad, and in the open air, it is not flothful, but ever in employment; it feedeth upon fresh Cares, and unbothe: it is without Cares and Envy.

50. For the Military life, we have a good opinion of that whilst a man is young. Certainly many excellent Warriors have been long-liv'd; Corvinus, Camillus, Xenophon, Agesilaus, with others both ancient and modern. No doubt it furthcrer long life to have all things from our youth to our elder age mended, and grow to the better, that a Youth full of croffes may minifter sweetness to our Old age. We conceive alfo that Military affections, inflamed with a desire of Fighting, and hope of Victory, do infufe such a heat into the Spirits, as may be profitable for long life.
Medicines for Long Life.

The Art of Physick, which we now have, looks no farther commonly than to Conser-
vation of Health and Cure of Diseases: As for those things which tend properly to
Long Life, there is but slight mention, and by the way only. Notwithstanding we will
propound those Medicines which are notable in this kind, I mean, those which are Cordials.
For it is consonant to reason, that those things which being taken in Cures do defend and
fortify the Heart, or, more truly, the Spirits, against Poisons and Diseases, being trans-
ferred with judgment and choice into Diet, should have a good effect, in some sort, towards
the Prolonging of Life. This we will do, not heaping them promiscuously together, (as
the manner is) but selecting the best.

Gold is given in three forms; either in that which they call Aurum potabile, or in
Wine wherein Gold hath been quenched, or in Gold in the Substance, such as are Leaf-
gold, and the Filings of Gold. As for Aurum potabile, it is used to be given in dispe-
rate or dangerous diseases, and that not without good success. But we suppose that
the Spirits of the Salt, by which the Gold is dissolved, do rather minifter that virtue
which is found in it, than the Gold itself; though this secret be wholly suppressed.
Now if the body of Gold could be opened with these Corrosive waters, or by these
Corrosive waters (to the venomous quality were wanting) well washed, we conceive
it would be no profitable Medicine.

Pearls are taken either in a fine Powder, or in a certain Mafs, or Dissolution by
the juice of four and new Limons: and they are given sometimnes in Aromatical Confe-
fications, sometimes in Liquor. The Pearl, no doubt, hath some affinity with the Shell in
which it groweth, and may be of the fame quality with the Shells of Craw-fishes.

Amongst the transparent precious Stones, two only are accounted Cordials, the Eme-
rault and the jacinth, which are used under the same forms that the Pearls are; save
only that the dissolutions of them, as far as we know, are not in use. But we suspect
these Glassy jellies, left they should be cutting.

Of those which we have mentioned, how far and in what manner they are helpful, shall
be spoken hereafter.

Eczear-Stone is of approved virtue for refreshing the Spirits, and procuring a gen-
tle Sweat. As for the Unicorn’s Horn, it hath lost the credit with us; yet so, as it
may keep rank with Hart’s Horn, and the Bone in the heart of a Hart, and Ivory,
and such like.

Amber-grease is one of the belt to appease and comfort the Spirits.

Hereafter follow the names only of the Simple Cordials, seeing their Vertues are suffi-
ciently known.

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Seeing our speech now is of those things which may be transferred into Diet, all hot
Waters and Chymical Oiles, (which, as a certain Tripper saith, are under the Planet
Mars, and have a furious and destructive force) as also all hot and burning Spices are
to be rejected, and a Consideration to be had, how Waters and Liquors may be made of
the former simples: not those phlegmatick distilled waters, nor again those burning waters
of spirits of wine; but such as may be more temperate, and yet lively, and sending forth
a bener Vapour.

I make some question touching the frequent letting of Blood, whether it conduceth to
long life nor no; and I am rather in the opinion that it doth, if it be turned into a
habit, and other things be well disposed: for it letteth out the old Juice of the body,
and bringeth in new.
The History of Life and Death.

I suppose also, that some Emaciating Diseases well cured, do profit to long life, for they yield new Juice, the old being consumed; and, as (as he faith) To recover a fieknesse is to renew youth: Therefore it were good to make some Artificial Diseases, which is done by strict and Emaciating Diets, of which I shall speake hereafter.

The Intentions.

Having finisht the Inquisition according to the Subjects, as namely, of Inanimate Bodies, Vegetables, Living Creatures, Man; I will now come nearer to the matter, and order more Inquisitions by certain Intentions, such as are true and proper, (as I am wholly persuaded) and which are the very paths to Mortal Life. For in this part, nothing that is of worth hath hitherto been inquired, but the contemplations of men have been but simple, and non-profitious. For when I hear men on the one side speak of comforting Natural heat, and the Radical moisture, and of Mews which breed good Blood, such as may neither be burnt nor phlegmatic; and of the e'erering and recreating the Spirits: I suppose them to be no bad men which speak these things: but none of these worketh effectually towards the end. And when on the other side I hear several discourse touching medicines made of Gold, because Gold is not subject to corruption; and touching Precious stones to refresh the spirits by their hidden properties and lustre, and that if they could be taken and retained in Vejels, the Balms, and Quintessences of living Creatures, would make men conceive a proud hope of Immortality: And that the Feath of Serpents and Harts, by a certain consent, are powerful to the Renovation of Life, because the one caleft his Skin, the other his Horns: (they should also have added the Feath of Eagles, because the Eagle changes his Bill.) And that a certain Man, when he had found an Ointment hidden under the ground, and had anointed himself therewith from head to foot, (excepting only the soles of his feet) did, by his anointing, live three hundred years, without any disease, save only some tumours in the soles of his feet: and of Artificial, who when he found his Spirit ready to depart, drew into his body the spirits of a certain young man, and thereby made him breathles, but himself lived many years by another mans Spirit: And of Fortunate Hours according to the Figures of Heaven, in which Medicines are to be gathered and compounded for the prolongation of Life: and of the Scales of Planets, by which veritudes may be drawn and fixed down from Heaven to prolong Life: and subtle, fabulous and superstitious vanities: I wonder exceedingly that men should so much deat, as to suffer themselves to be deluded with these things. And again, I do pity mankind that they should have the hard fortune to be besieged with such frivolous and finceless apprehensions. But more Intentions do both come home to the Matter, and are far from vain and credulous Imagination: being also such, as I conceive, poverty may add much to the masters which satisfie these Intentions: but to the Intentions themselves, but a little. Notwithstanding there are a few things, and those of very great moment, of which I would have men to be forewarned.

First, we are of that opinion, that we esteem the Offices of Life to be more worthy than Life itself. Therefore if there be any thing of that kind that may indeed answer our Intentions, yet so, that the Offices and Duties of Life be thereby binded; whatsoever it be of this kind, we reject it. Perhaps memory may frame some light mention of some things, but we insist not upon them. For we make no serious nor diligent discourse, either of leading the life in Caves, where the Sunbeams and several changes of the Air piece not, like Epimenides his Cave; or of perpetual baths, made of Liquors prepared; or of Shirts, and Scar-cloths so applied, that the body should be always as it were in a box; or of thick paintings of the body, after the manner of some Barbarous Nations; or of an exact ordering of our Life and Diet, which nimely only at this, and mindest nothing else but that a man live, (as was that of Herodotus amongst the Antients, and of Cornarius the Venetian in our days, but with greater moderation;) or of any such Prodigy, Redouhls, or Inconvenience: but we propound such remedies and Precepts, by which the Offices of Life may neither be deferred, nor receive any great interruptions or molestations.

Secondly,
The History of Life and Death.

Secondly, on the other side we denounce unto men that they shall give over trifling, and not imagine that to great a work at the flapping and turning back the powerful course of nature, can be brought by pas by some Morning-draught, or the taking of some precious<br>Draught, but that they would be assured that it must needs be, that this is a work of labour, and consists of many Remedies, and a strict confection of them amongst themselves; for no man can be so stupid as to imagine, that what was never yet done, can be done, but by such ways as were never yet attempted.

Firstly, we ingeniously profess, that some of those things which we shall propound have not been tried by us by way of Experiment, (for our course of life does not permit that,) but are derived (as we suppose) upon good reason, out of our Principles and Grounds, (of which some we set down, others we reserve in our mind,) and are, as it were, cut and digged out of the Rock and Mine of Nature her self. Nevertheless we have been careful, and that with all prudence and circumspection, (seeing the Scripture faith of the Body of Man, that it is more worth than Kaiment,) to propound such Remedies, as may at least be safe, if peradventure they be not fruitful.

Fourthly, we would have men rightly to observe and distinguish, that those things which are good for an Healthful Life, are not always good for a Long Life; for there are some things which do further the alacrity of the Spirits, and the strength and vigour of the Functions, notwithstanding, do cut off from the sum of Life; and there are other things, which are profitable to prolongation of Life, which are not without some peril of health, unless this matter be salved by just Remedies; of which, notwithstanding, as occasion shall be offered, we will omit to give some Cautions and Monitions.

Lastly we have thought good to propound sundry Remedies, according to the several Intentions; but the choice of those Remedies, and the order of them, to leave to Discretion: for to set down exactly which of them agree best, with which Constitution of body, which with the several courses of Life, which with each Man particular Age, and how they are to be taken one after another, and how the whole Practice of these things is to be administered and governed, would be too long, neither is it fit to be published.

In the Topicks we propounded three Intentions: The Prohibiting of Consummation, The Perfecting of Reparation, and the Renewing of Oldness. But seeing those things which shall be said are nothing less than words, we will deduce these three Intentions to ten Operations.

The first is, the Operation upon the Spirits that they may renew their vigour.

The second Operation is upon the Exclusion of Air.

The third Operation is upon the Blood, and the Sanguifying Heart.

The fourth Operation is upon the Juices of the Body.

The fifth Operation is upon the Bowels, for their Extrusion of Aliment.

The sixth Operation is upon the Outward Parts, for their Attraction of Aliment.

The seventh Operation is upon the Aliment itself, for the Infinuation thereof.

The eighth Operation is upon the last Act of Affiliation.

The ninth Operation is upon the Interceration of the Parts, after they begin to be dried.

The tenth Operation is upon the Larguing away of Old Juice, and Supplying of New Juice.

Of these Operations, the four first belong to the first Intention, the four next to the second Intention, and the two last to the third Intention.

But because this part touching the Intentions doth tend to Practice, under the name of History, we will not only comprise Experiments and Observations, but also Counsels, Remedies, Explications of Caufes, Aflumptions, and whatsoever hath reference hereunto.

F 2
The Operation upon the Spirits that they may remain Youthful, and renew their Vigour.

The History.

1. The Spirits are the Master-workmen of all effects in the Body. This is manifestly by Confect, and by infinite instances.

2. If any man could procure that a young man's Spirit could be conveyed into an old man's Body, it is not unlikely but this great Wheel of the Spirits might turn about the lesser Wheel of the Parts, and so the course of Nature become retrograde.

3. In every Consumption, whether it be by Fire or by Age, the more the Spirit of the Body, or the Heat, preyth upon the Moisture, the lesser is the duration of that thing. This occurs everywhere, and is manifest.

4. The Spirits are to be put into such a temperament and degree of activity, that they should not (as he faith) drink and guzzle the juices of the Body, but sip them only.

5. There are two kinds of Flames: the one eager and weak, which consumes flight substances but hath little power over the harder; as the flame of straw, or small Sticks: the other strong and constant, which converts hard and obstinate substances: as the flame of hard wood, and such like.

6. The eager flames, and yet less robust, do dry Bodies, and render them exhaust and sapless: but the stronger flames do penetrate and melt them.

7. Also in Diffusing Medicines, some vapour forth the thin part of the tumors or swellings, and these harden the tumour; others potently ducuf, and these soften it.

8. Also in Purging and Absterging Medicines, some carry away the fluid humors violently, others draw the more obstinate and vicious.

9. The Spirits ought to be invested and armed with such a heat, that they may chuce rather to stir and undermine hard and obstinate matters, than to discharge and carry away the thin and prepared; for by that means the Body becomes green and solid.

10. The Spirits are so to be wrought and tempered, that they may be in Substance Dense, not Rare; in Heat strong, not Eager; in Quantity Sufficient for the offices of Life, not Redundant or Rigid; in Motion Appeased, not Dancing or Unequal.

11. That Vapours work powerfully upon the Spirits, it is manifestly by Sleep, by Drunkenness, by Melancholick Passions, by letificant Medicines, by Odours, calling the Spirits back again in Swounings and Paintings.

12. The Spirits are condensed four ways: either by putting them to flight, or by refrigering and cooling them, or by broaching them, or by guissing them. And first of their Condensation by putting them to flight.

13. Whatsoever pethused to flight on all parts, driveth the body into his Centre, and so Condenses.

14. To the Condensation of the spirits by flight, the most powerful and effectual is Opium, and next Opiates, and generally all Soporiferous things.

15. The force of Opium to the condensation of the spirits is exceeding strong, whenas perhaps three grains thereof will in a short time so coagulate the Spirits, that they're turn no more, but are extinguished, and become immoveable.

16. Opium, and the like, put not the Spirits to flight by their coldness, for they have parts manifestly hot; but, on the contrary, cool by their putting the Spirits to flight.

17. The Flight of the Spirits by Opium and Opiate Medicines is best seen by applying the same outwardly; for the Spirits straight with draw themselves, and will return no more, but the part is mortifie, and turns to a Gangrene.

18. Opiates, in grievous pains, as in the Stone, or the cutting off of a Limb, mitigate pains most of all, by putting the spirits to flight.

19. Opiates obtain a good effect from a bad cause; for the Flight of the Spirits is evil, but the Condensation of them through their flight is good.

The
The Grecians attributed much, both for health and for prolongation of life, as Opiates: but the Arabians much more, infomuch that their grand Medicines (which they called the gods Hands) had Opium for their Basis and principal ingredient, other things being mixed to abate and correct the noxious qualities thereof; such were Treacle, Methylate, and the rest.

Whatsoever is given with good success in the curing of Pestilential and Malignant Diseases, to stop and bridle the Spirits, lest they grow turbulent and tumultuous, may very happily be transferred to the prolongation of life; for one thing is effectual unto both, namely, the confusion of the Spirits: now there is nothing better for that than Opiates.

The merry find Opium, even in a reasonable good quantity, harmless and comfortable, infomuch that they take it before their Battel to excite courage: but to us, unless it be in a very small quantity, and with good Correctives, it is more.

Opium and Opiates are manifestly found to excite Venus; which shews them to have force to corroborate the Spirits.

Distilled water of wilde Poppy is given with good success in Surfeits, Agues, and divers diseases; which no doubt is a temperate kind of Opiate. Neither let any man wonder at the various use of it: for that is familiar to Opiates, in regard that the Spirits, corroborated and condened, will rise up against any disease.

TheTurk use a Kind of Herb which they call Capke, which they dry and powder, and then drink in warm water; which, they say, doth not a little sharpen them, both in their Courage, and in their Wits: notwithstanding, if it be taken in a large quantity, it affects and disturbs the mind: whereby it is manifest, that it is of the same nature with Opiates.

There is a Root much renowned in all the Eastern parts, which they call betel, which the Indians and others use to carry in their mouths, and to champ it, and by that champing they are wonderfully enabled both to endure labours, and to overcome sicknesses; and to the act of carnal copulation: it seems to be a kind of stupefactive, because it exceedingly blackens the Teeth.

Tobacco in our age is immoderately grown into use, and it affects men with a secret kind of delight, infomuch that they who have once inured themselves unto it can hardly afterwards leave it: and no doubt it hath power to lighten the body, and to shake off weariness. Now the virtue of it is commonly thought to be, because it opens the passages, and voids humors: but it may more rightly be referred to the confusion of the Spirits; for it is a kind of Henbane, and manifestly troubles the Head, as Opiates do.

There are sometimes Humors engendered in the body, which are, as it were, Opiate themselves; as it is in some kind of Melancholy, with which if a man be affected, it is a sign of very long life.

The simple Opiates (which are also called stupefactive) are these: Opium itself, which is the juice of Poppy; both the Poppias well as the Herbs as in the Seed; Henbane, Mandrake, Hemlock, Tobacco, Night-shade.

The compound Opiates are, Treacle, Methylate, Trisera, Ladanum, Paracels, Dioscorides, Phalacron, Ulysses of round tongue.

From this which hath been said, certain Denials or Counsels may be deduced for the prolongation of life, according to the present intention; namely, of confounding the Spirits by Opiates.

Let there be therefore every year, from Adult years of Youth, an Opiate diet; let it be taken about the end of May, because the Spirits in the Summer are more loose and attenuated, and there are less dangers from cold humors; let it be some Magnifinal Opiate, weaker than those that are commonly in use, both in respect of a smaller quantity of Opium, and of a more sparing mixture of extreme hot things; let it be taken in the morning betwixt breakfasts. The fare for that time would be more simple and sparing than ordinary, without Wine, or Spices, or Vapourous things. This Medicine to be taken only each other day, and to be continued for a fortnight. This Delegation in our judgment comes home to the intention.

Opiates also may be taken, not only by the mouth, but also by Noses; but the Fumes must be such as may not move the expulsive Faculty too strongly, nor force down humors, but only taken in a West, may work upon the Spirits within the brain. And therefore a Sulfuration of Tobacco, Lignum-Alci, Rosmary-leaves dried.
dried, and a little Myrrhe stuffed up in the morning at the mouth and nostrils, would be very good.

In Grand Opiates, such as are Treacle, Methridate, and the rest, it would not be amis (especially in youth) to take rather the distilled waters of them than themselves in their bodies; for the vapour in distilling doth rise, but the heat of the Medicine commonly feelth. Now distilled waters are good in those vertues which are conveyed by Vapours, in other things but weak.

There are Medicines which have a certain weak and hidden degree, and therefore safe to an Opiate vertue; these fend forth a flow and copious vapour, but not malignant as Opiates do, therefore they put not the Spirits to flight; notwithstanding they congregate them, and somewhat thicken them.

Medicines in order to Opiates are principally Saffron, next Fallun Indani, Amber-greese, Cardier-end, prepared, Amomum, Pseuda-momum, Lignum-Rosatum, Orange-flow'r water, and much more the Infusion of the same flowers now gathered in the Oil of Almonds; Nutmegs pricked full of holes, and macerated in Rose-water.

As Opiates are to be taken very sparingly, and at certain times, as was said, so these secondaries may be taken familiarly, and in our daily diet, and they will be very effectual to prolongation of life. Certainly an Apothecary of Calcuta, by the use of Amber, is said to have lived an hundred and sixty years; and the Noble-men of Barbary, through the use thereof, are certified to be very long liv'd, whereas the mean people are but of short life. And our Ancestors, who were longer liv'd than we, did use Saffron much in their Cakes, Broths, and the like. And Touching the first way of confounding the Spirits of Opiates and the Subordinates thereto, thus much.

Now we will enquire of the second way of confounding the spirits by Cold. For the proper work of Cold is Condenfation, and it is done without any malignity, or adverse quality; and therefore it is a safer operation than by Opiates, though somewhat less powerful, if it be done by turns only, as Opiates are. But then again, because it may be used familiarly, and in our daily diet with moderation, it is much more powerful for the prolongation of life than by Opiates.

The Refrigeration of the Spirits is effected three ways, either by Restitution, or by Vapours, or by Aliments. The first is the best, but, in a sort, out of our power; the second is potent, but yet ready, and at hand; the third is weak, and somewhat about.

Air clear and pure, and which hath no fogginfs in it, before it be received into the Lungs, and which is left exposed to the Sun-beams, condenfeth the Spirits bey. Such is found either on the tops of dry Mountains, or in Champagne open to the wind, and yet not without some shade.

As for the Refrigeration and Condenfation of the Spirits by Vapours, the Root of this operation we place in Nitre, as a Creature purposely made and chosen for this end, being thereunto led, and perswaded by these Arguments.

Nitre is a kind of cool Spice: this is apparent to the sense itself, for it bites the Tongue and Palate with cold, as Spices do with heat, and it is the only thing, as far as we know, that hath this property.

Almost all cold things (which are cold properly, and not by accident, as Opium is) are poor and jeune of Spirit; contrarily, things full of Spirit are almost all hot, onely Nitre is found amongst Vegetables, which aboundeth with Spirit, and yet is cold. As for Camphire, which is full of Spirit, and yet performeth the actions of cold, it cooleth by accident only; as namely, for that by the thinness thereof, without Accompaniments, it helpeth perspiration in inflammations.

In congealing and freezing of Liquors, (which is lately grown into ufe) by laying Snow and Ice on the out-side of the Vessel, Nitre is also added, and no doubt it exciteth and fertilizeth the Congelation. It is true, that they use it also for this work ordinary Bay-Salt, which doth rather give activity to the coldness of the Snow, than cool it by itself; But, as I have heard, in the hotter Regions, where Snow falls not, the congealing is wrought by Nitre alone; but this I cannot certainly affirm.

It is affirmed that Gun powder, which confineth principally of Nitre, being taken in drink, doth conduces to valour, and that it is used offentimes by Mariners and Soldiers before they begin their Battells, as the Turks do Opium.

Nitre
The History of Life and Death.

Nitre is given with good success in burning Agues, and Pelletial Fevers, to mitigate and bridle their pernicious heats.

It is manifest, that Nitre in Gun-powder doth mightily abhor the Flame, from whence is caused that horrible Crack and puffing.

Nitre is found to be, as it were, the Spirit of the Earth: for this is most certain, that any Earth, though pure and unmixed with Nitreous matter, if be so laid up and covered, that it be free from the Sun-beams, and puteth forth no Vegetable, will gather Nitre, even in good abundance. By which it is clear, that the Spirit of Nitre is not only inferior to the Spirit of living Creatures, but also to the Spirit of Vegetables.

Cattle which drink of Nitreous water do manifestly grow fat, which is a sign of the cold in Nitre.

The manuring of the Soil is chiefly by Nitreous Substances; for all Dung is Nitreous, and this is a sign of the Spirit in Nitre.

From hence it appears, that the Spirits of Man may be cooled and condensed by the Spirit of Nitre, and be made more crude, and less eager. And therefore, as strong Wines, and Spices, and the like, do burn the Spirits, and shorten life; so on the contrary side, Nitre doth compose and repress them, and furthereth to life.

Nitre may be used with meat, mixed with our Salt, to the tenth part of the Salt; in Broths taken in the morning, for three grains to ten, also in Beer: but however it is used, with moderation, it is of prime force to long life.

As Opium holds the preeminence in condensing the Spirits, by putting them to flight, and hath withal his Subordinate, less potent, but more safe, which may be taken both in greater quantity, and in more frequent use, of which we have formerly spoken: so also Nitre, which condenseth the Spirits by cold, and by a kind of Freecour, (as we now a-days speak) hath also his Subordinates.

Subordinates to Nitre are, all those things which yield an O'Jour somewhat Earthy, like the smell of Earth, pure and good, newly dug or turned up; of this sort the chief are, Orange, Raisins, Love-apple, Strawberries; and Strawberry-leaves and Strawberries, Brambles of Rufius, Strawberries, Cucumber, hoopmauns, Vine leaves, and Buds; also Violets.

The next in order are those which have a certain freshness of smell, but somewhat more inclined to heat; yet not altogether void of that virtue of refreshing by coolness; such as are Balm, green Citron, green Orange, Rose-water distilled, roasted Wardens; also the Damask, Red, and Musk Roses.

This is to be noted, that Subordinates to Nitre do commonly confer more to this Intention, &c., then having palled the Fire, because that the Spirit of Cooling is dissipated by the Fire; therefore they are best taken, either infused in some liquor or raw.

As the condensation of the Spirits by Subordinates to Opium is, in some sort, performed by Odours, so also that which is by Subordinates to Nitre; therefore the smell of new and pure Earth, taken either by following the Plough, or by digging, or by weeding, excellently refresheth the Spirits. Also the Leaves of Trees in Woods, or Hedges, falling towards the middle of Autumn, yield a good refreshment to the Spirits, but none so good as Strawberry-leaves dying. Likewise the smell of Violets, or Wall-flowers, or Bean-flowers, or Sweet-brier, or Hony-jackles, taken as they grow, in palling by them alone, is of the same nature.

Nay, and we know a certain great lord who lived long, that had every morning immediately after sleep, a Cloath of fresh Earth laid in a fair Napkin under his Nose, that he might take the smell thereof.

There is no doubt, but the cooling and tempering of the blood by cool things, such as are Eudove, Succory, Lover-wort, Purslane, and the like, do also by consequent cool the Spirits; but this is about, whereas vapours cool immediately.

And as touching the condensing of the Spirits by Cold, thus much: The third way of conducting the Spirits, we said to be by that which we call broaking the Spirits: The fourth, by quieting the alacritiy and unwillingness of them.

Such things frde the Spirits as are pleasing and friendly to them, yet they allure them not to go abroad; but rather prevent, that the Spirits contented, as it were, in
in their own society, do enjoy themselves, and betake themselves into their proper Centre.

For these, if you recollect those things which were formerly set down, as Subordinates to Opium and Nitre, there will need no other Inquisition.

As for the quieting of the unruliness of the Spirits, we shall presently speak of that, when we enquire touching their Motion. Now then, seeing we have spoken of that Condensation of the Spirits which pertaineth to their substance, we will come to the temper of Heat in them.

The Heat of the Spirits, as we said, ought to be of that kind that it may be robust, not eager, and may delight rather to madder the tough and obstinate, than to carry away the thin and light humors.

We must beware of Spices, wine, and strong Drinks, that our use of them be very temperate, and sometimes discontinued; also of Savory, Wild marjoram, penny-royal, and all such as bite and heat the tongue; for they yield unto the Spirits an heat not operative, but predatory.

These yield a robust heat, especially Flecampone, Garlic, Cardus Benedictus, Water-cresses while they are young, Germander, Angelica, Zedoary, Veronica, Valerian, Myrrhe, Pepper-wort, Elder flowers, Garden-Chervile: The use of these things with choice and judgement, sometimes in Sallads, sometimes in Medicines, will satisfy this Operation.

It falls out well that the Grand Opiates will also serve excellently for this Operation, in respect that they yield such a heat by composition, which is wi\th, but not to be found, in Simples. For the mixing of those excise hot things (such as are Euphorbiun, Pellitory of Spain, sesam-acre, Dragon-wort, Anacardi, calforeum, Aristolochium, Opponum, Antemoniacum, Galbanum, and the like, which of themselves cannot be taken inwardly) to qualify and abate the stupefactive virtue of the Opium. they do make such a constitution of a Medicament as we now require; which is excellently seen in this, That Trench and Methridate, and the rest, are not sharp, nor bite the tongue, but are only somewhat bitter, and of strong scent, and at last manifest their heat when they come into the stomach, and in their subsequenc operations.

There conduce also to the robust heat of the Spirits Venus often excited, rarely performed; and no less some of the affections, of that shall be spoken hereafter. So touching the heat of the Spirits, Analagical to the prolongation of Life, thus much.

Touching the Quantity of the Spirits, that they be not exuberant and boiling, but rather sparing, and within a mean, (seeing a small flame doth not devour so much as a great flame;) the Inquisition will be short.

It seems to be approved by experience, that a faire Diet, and almost a Pythagorical, such as is either preferred by the strict Rules of a Monastic life, or practized by Hermits, which have Necessity and Poverty for their Rule, rendeth a man long-lived.

Hitherto appertain drinking of water, a hard Bed, abstinance from Fire, a slender Diet, (as namely, of herbs, Fruits, Egg, and Fish; rather powdered and salted than fresh and hot) an Hair-shirt, frequent Fastings, frequent Watchings, few sensual Pleasures, and such like; for all these diminish the Spirits, and reduce them to such a quantity as may be sufficient only for the Functions of Life, whereby the depreciation is the less.

But if the Diet shall not be altogether so vigorous and mortifying, yet notwithstanding shall be always equal and constant to it fall, it worketh the same effect. We see it in Flames, that a Flame somewhat bigger (so it be always alike and quiet;) consumeth less of the fuel than a letter Flame blown with Bellows, and by Quifs stronger or weaker: That which the Regiment and Diet of Cornarius the Venetian shewed plainly, who did eat and drink so many years together by a jult weight, whereby he exceeded an hundred years of age, strong in limbs, and intire in his senses.

Care also must be taken, that a body plentifully nourished, and not emaciated by any of these aforesaid Diets, omitte not a feasible ufe of Venus, left the Spirits increase too fast, and often destroy the body. So then, touching a moderate quantity of Spirits, and (as we may say) Frugal, thus much.

The Inquisition touching bridling the motions of the Spirits followeth next.
The History of Life and Death.

Motion doth manifestly attenuate and inflame them. This brevity is done by three means: 

by Sleep; by avoiding of vehement Labour; violent Exercise, and, in a word, all Latitude; and by restraining of some Affections. And first, touching Sleep.

The Fable tells us, that Epimenedes slept many years together in a Cave, and all that time needed no meat, because the Spirit was then not much in sleep.

Experience teacheth us that certain Creatures, as Dormice and Bats, sleep in some close places an whole Winter together; such is the force of sleep to restrain all vital Consumption. That which Bees and Drones are also thought to do, though sometimes distillate of Honey, and likewise Butter-flies, and other Flies.

Sleep after Dinner (the stomach standing up no unpleasing Vapours to the head, as being the first Dews of our Meat) is good for the spirits, but derogatory and hurtful to all other points of health. Notwithstanding in extreme old age there is the same reason of Meat and Sleep, for both our meals and our sleeps should be then frequent, but short and little; nay, and towards the last period of old age, a mere rest; and as it were, a perpetual repose doth beft, especially in Winter-time.

But as moderate sleep conferreth to long life, so much more if it be quiet and not disturbed.

These procure quiet sleep, Violets, Lettuce, especially boiled, Sirup of dried Roses, Saffron, Balm, Apples; at our going to bed; a sop of Bread in Molasses, especially where Musk-Roses have been first infused: therefore it would not be amiss to make some Pils, or a small Draught of these things, and to use it familiarly. Also those things which flow the mouth of the stomach close, as Coriander-seed prepared, Quinces and Wardens roasted, do induce sound sleep; but above all things in youth, and for those that have sufficient strong stomacks, it will be best to take a good draught of cold Water when they go to bed.

To chuse voluntary and procured Trances, as also fixed and profound Thoughts, so as they be without rackamens, I have nothing certain: no doubt they make to this intent, and condense the Spirits, and that more potently than Sleep, seeing they lay asleep, and suspend the senses as much or more. Touching them, let further inquiry be made. So far touching Sleep.

As for Motion and Exercise, Latitude hurthe, and so doth all Motion and Exercise which is too nimble and swift, as Running, Tennis, Fencing, and the like; and again, when our strength is extended and strained to the uttermost, as Dancing, Wrestling, and such like: for it is certain, that the spirits being driven into straights, either by the swiftness of the motion, or by the straining of the forces, do afterward become more eager and predatory. On the other side, Exercise which stir up a good strong motion, but not over-swift, or to our utmost strength, (such as are Leaping, Shooting, Riding, Bowing, and the like) do not hurt, but rather benefit.

We must come now to the Affections and Passions of the Mind, and see which of them are hurtful to long life, which profitable.

Great joys attenuate and diffuse the spirits, and shorten life; familiar Cheerfulness strengthens the spirits, by calling them forth, and yet not resolving them. Impressions of joy in the senses are naught; ruminations of joy in the memory, or apprehensions of them in hope or fancy, are good.

Joy suppressed, or communicated sparingly, doth more comfort the spirits than joy poured forth and published.

Grief and sadness, if it be void of Fear, and afflict not too much, doth rather prolong life; for it contracteth the spirits, and is a kind of condensation.

Great Fears shorten the life: for though Grief and Fear do both frighten the spirit, yet in Grief there is a simple contraction; but in Fear, by reason of the cares taken for the remedy, and hopes intermixed, there is a turmoil and vexing of the spirits.

Anger suppressed is also a kind of vexation, and causeth the spirit to feed upon the juices of the body; but let loose and breaking forth, it helpeth: as those medicines do which induce a robust heat.

Envy is the worst of all Passions, and feedeth upon the spirits, and they again upon the body; and so much the more because it is perpetual, and, as it is said, keeps no holidays.

Pity of another man's misfortune, which is not likely to befall our selves, is good: but
but Pity, which may reflect with some similitude upon the party pitying, is naught, because it exciteth Fear.

88. Light and shade hurteth not, seeing it contracteth the Spirit a little, and then straight diffuseth them: infomuch that homely persons commonly live long: but shade for some great ignominy, and which afflicteth the mind long, contracteth the Spirit even to suffocation, and is pernicious.

89. Love, if it be not unfortunate, and too deeply woundeth, is a kind of joy, and is subject to the same Laws which we have set down touching joy.

90. Hope is the most beneficial of all the Affections, and doth much to the prolongation of life, if it be not too often frustrated, but entertaineth the Fancy with an expectation of good: therefore they which fix and propound to themselves some end, as the mark and scope of their life, and continually and by degrees go forward in the same, are, for the most part, long-lived; in so much that when they are come to the top of their hope, and can go no higher therein, they commonly droop, and live not long after: So that Hope is a Leaf-joy, which may be beaten out to a great extent, like Gold.

Admiration and light contemplation are very powerful to the prolonging of life; for they hold the Spirit in such things as delight them, and suffer them not to tumultuate, or to carry themselves unequally and waywardly. And therefore all the Contemplators of Natural things, which had so many and eminent Objects to admire, (as Democritus, Plato, Parmenides, Apollonius) were long-lived: also rhetoricians, which talked but lightly of things, and studied rather Exordiation of speech than profundity of matters, were long-lived: as Gorgias, tragedians, orators, seneca. And certainly, as old men are for the most part talkative, so talkative men do oft con very old; for it flva a high contemplation, and such as doth not much stain the Spirit, or vex then: but still, and acute, and eager inquisition shortens life; for it tireth the Spirit, and waleth it.

And as touching the motion of the Spirit by the Affections of the Mind, thus much. Now we will add certain other general Observations touching the Spirit, beside the former, which fall not into the preceding distribution.

92. Special care must be taken that the Spirit be not too often resolved; for attenuation goeth before resolution, and the Spirit once attenuated doth not very easily retire, or is condensed. Now Resolution is caused by over-great labours, over-vehement affections of the mind, over great sweets, over great evacuations, hot Baths, and an untemperate and unseasonable use of Venus; also by over-great cares and carping, and anxious expectations; lastly, by malignant diseases, and intolerable pains and torments of the body; all which, as much as may be, (which our vulgar Hypercians also advise) must be avoided.

93. The Spirit is delighted both with wanted things, and with new. Now it maketh wonderfully to the contemplation of the Spirit in vigour, that we neither use wanted things to a satiety and glutting; nor new things, before a quick and strong appetite. And therefore both customs are to be broken off with judgment and care, before they breed a fulness; and the appetite after new things to be restrained for a time until it grow more sharp and jocund: and moreover, the life, as much as may be, so to be ordered, that it may have many renovations, and the Spirit by perpetual conversing in the same actions may not wax dull. For though it were no ill saying of seneca's, The fool dost ever begin to live; yet this folly, and many more such, are good for long life.

94. It is to be observed touching the Spirit. (though the contrary used to be done) That when men perceive their Spirit to be in good, placid, and healthful state, (that which will be seen by the tranquility of their Mind, and cheerful disposition) that they cherish them, and not change them: but when, in a turbulent and untoward state, (which will also appear by their badness, impatience, and other indisposition of their mind,) that then they straight overweigh them, and alter them. Now the Spirit are contained in the same state, by a restraining of the affections, temperateciues of diet, abstinence from Venus, moderation in labour, indifferent rest and repose: and the contrary to these do alter and overweigh the Spirit; as namely, vehement affections, profuse feastings, immoderate Venus, difficult labours, earnest Studies, and prosecution of business. Yet men are wont, when they are merrited and best disposed, then to apply themselves to feastings, Venus.
The History of Life and Death.

Venus, Labours, Endeavours, Busineses, whereas if they have a regard to long life, (which may seem strange) they should rather practice the contrary. For we ought to cherish and preserve good spirits, and for the evil-disposed spirits to discharge and alter them.

Venus faith not unwisely, That old men, for the comforting of their spirits, ought often to remember and ruminate upon the Aids of their Childhood and Youth. Certainly such a remembrance is a kind of peculiar Recreation to every old man; and therefore it is a delight to men to enjoy the society of them which have been brought up together with them, and to visits the places of their education. Vespasian did attribute so much to this matter, that when he was Emperor he would by no means be persuaded to leave his Father's house, though but mean, left he should lose the wonted object of his eyes, and the memory of his childhood; and besides, he would drink in a wooden cup, tipped with silver, which was his Grandmother's, upon Festival days.

One thing above all is grateful to the Spirits, that there be a continual progress to the more benefit; therefore we should lead such a Youth and Manhood, that our Old age should find new Solaces, whereof the chief is moderate ease: And therefore old men in honourable places lay violent hands upon themselves, who retire not to their ease: whereof may be found an eminent Example in Caffodorus, who was of that reputation amongst the Gobjsh Kings of Italy, that he was as the Soul of their affairs; afterwards, being near eighty years of age, he betook himself to a Monastery, where he ended not his days before he was an hundred years old. But this thing doth require two Cautions: one, that they drive not off till their bodies be utterly worn out and disfigured; for in such bodies all mutation, though to the more benefit, halfeven death: the other, that they surrender not themselves to a flagitious ease, but that they embrace something which may entertain their thoughts and mind with contemplation; in which kind the chief delights are Reading and Contemplation; and then the desires of Building and Planting.

Lastly, the same Action, Endeavour and Labour undertaken cheerfully and with a good will doth refresh the Spirits; but with an averseation and muscularites, doth not and deject them. And therefore it conferreth on long life, either that a man hath the art to institute his life so as it may be free and suitable to his own humour; or else to lay such a command upon his mind, that whatsoever is imposed by Fortune, it may rather lead him than drag him.

Neither is that to be omitted towards the government of the Affections, that especial care be taken of the mouth of the Stomach, especially that it be not too much relaxed, for that part hath a greater dominion over the affections, especially the daily affections, than either the Heart or Brain, only those things excepted which are wrought by potent vapours, as in Drunkenness and Melancholy.

Touching the Operation upon the Spirits, that they may remain youthful, and re- new their vigours, thus much: which we have done the more accurately, for that there is, for the most part, amongst Physicists and other Authors touching these Operations a deep silence; but especially, because the Operation upon the Spirits, and their withering green again, is the most ready and compendious way to long life; and that for a two fold compendiousness: one, because the Spirits wrought compendiously upon the body, the other, because Vigours and the Affections work compendiously upon the Spirits; so as these attain the end, as it were, in a right line, other things rather in lines circular.

The Operation upon the Exclusion of the Air. 2.

The History.

The Exclusion of the Air ambient tendeth to length of life two ways: First for that the External Air, next unto the Nature Spirit, (howsoever the Air may be said to animate the Spirit of Man, and conferreth not a little to health) doth most of all prey upon the juices of the body,
and hasten the Desiccation thereof; and therefore the Exclusion of it is effectual to length of life.

Another effect which followeth the Exclusion of Air is much more subtle and profound, namely, that the Body closed up, and not perspiring by the pores, detaineth the Spirit within, and turneth it upon the harder parts of the body, whereby the Spirit mollifies and internerates them.

Of this thing the reason is explained in the Desiccation of Inanimate Bodies; and it is an Axiom almost infallible, That the Spirit discharg'd and instilling forth, drieth Bodies; detained, melteth and internerates them. And it is further to be understood, That all Heat doth properly attenuate and moisten, and contrasteth and drieth only by Accident.

Leading the life in Dens and caves, where the Air receives not the Sun-beams, may be effectual to long life. For the Air of it self doth not much towards the depredation of the body, unless it be firmed up by heat. Certainly, if a man shall recall things past to his memory, it will appear that the stature of men have been anciently much greater than those that succeeded, as in Sicily, and some other places: but this kind of men led their lives, for the most part, in Caves. Now length of life and largeness of limbs have some affinity. The Cave also of Epimenides walks among the Fables. I suppose like wise, that the life of Columnar Authoritie was a thing resembling the life in Caves, in respect the Sun-beams could not much pierce thicker, nor the Air receive any great changes or inequalities. This is certain, both the Simeon Stella's, as well Daniel as Saba, and other Columnar Authoritie, have been exceeding long liv'd. Likewise the Authoritie in our days, closed up and immured either within Walls or Pillars, are often found to be long liv'd.

Next unto the life in Caves is the life on Mountains: for as the beams of the Sun do not penetrate into Caves; so on the tops of Mountains, being destitute of Reflection, they are of small force. But this is to be understood of Mountains where the Air is clear and pure; namely, whether by reason of the dryness of the Valleys, Clouds and Vapours do not ascend; as it is in the Mountains which encompass Barbary, where, even at this day, they live many times to an hundred and fifty years, as hath been noted before.

And this kind of Air of Caves and Mountains, of its own proper nature, is little or nothing predatory; but Air, such as ours is, which is predatory through the heat of the Sun, ought as much as is possible to be excluded from the body.

But the Air is prohibited and excluded two ways: first, by closing the Pores; secondly, by filling them up.

To the closing of the Pores help coldness of the air, going naked, whereby the skin is made hard, washing in cold water, Astringents applied to the skin, such as are Mastic, Myrtle, Myrtle.

But much more may we satisfie this Operation by baths, yet those rarely used, (especially in Summer) which are made of Astringent Mineral waters, such as may safely be used, as Waters participating of Steel and Copper; for these do potently contract the skin.

As for filling up the Pores, Paintings and such like Doubtous Dainties, and (which may most commodiously be used) Oil and fat things, do no less confer the substance of the body, than Oil-colours and Varnish do preferre Wood.

The ancient Britains painted their bodies with锐an, and were exceeding long liv'd; the Picts also used paintings, and are thought by some to have derived their name from thence.

The Saxonians and Virginians paint themselves at this day, who are (especially the former) very long liv'd; infomuch that five years ago the French Jesuates had speech with some who remembered the building of Fernambuck, which was done an hundred and twenty years since, and they were then at Man's estate.

Joannes de temporibus, who is reported to have extended his life to three hundred years, being asked how he preferred himself so long, is said to have answered, by Oil without, and by Honey within.

The Irish, especially the nild-Irish, even at this day live very long; certainly they report, that within these few years the counties of Deirand lived to an hundred and forty years of age, and bred Teeth three times. Now the Irish have a fashion to chase, and, as it were, to bathe themselves with old Salt-butter against the fire.

The History of Life and Death.
The History of Life and Death.

The same Irish use to wear Saffroned Linen and Shirts: which though it were at first devised to prevent Vermin, yet howsoever I take it to be very useful for lengthening of life; for saffron, of all things that I know, is the best thing for the skin, and the comforting of the flesh, seeing it is both notably Altringent, and hath besides an Oleosity and subtile heat, without an Acrimony. I remember a certain Englishman, who when he went to Sea carried a bagg of Saffron next his Flomack, that he might conceal it, and so escape Custom; and whereas he was wont to be always exceeding Sea-fick, at that time he continued very well, and felt no provocation to vomit.

Hippocrates adviseth in Winter to wear clean Linen, and in Summer foul Linen and befmeared with Oil. The reason may seem to be, because in Summer the Spirits exhale most, therefore the pores of the skin would be filled up. Hereupon we are of opinion, that the use of Oil, either of Olives or sweet Almonds, to anoint the skin therewith, would principally conducte to long life: The anointing would be done every morning when we rise out of bed, with Oil in which a little Bay-leaf and Saffron is mixed. But this anointing must be lightly done with Wool, or some soft sponge, not laying it on thick, but gently touching and wetting the skin.

It is certain that Liquors, even the Oily themselves, in great quantities draw some-what from the body; but contrarily, in small quantities are drunk in by the body: therefore the anointing would be but light, as we said, or rather the skirt it self would be befmeared with Oil.

It may happily be objected, that this anointing with Oil, which we commend, (though it were never in use with us, and amongst the Italians is oft off again) was anciently very familiar amongst the Greeks and Romans, and a part of their Diet; and yet men were not longer liv'd in those dayes than now. But it may rightly be answered, Oil was in use only after Baths, unless it were perhaps amongst Chaldaeans: now hot Baths are as much contrary to our operation, as anointings are congruous, seeing the one opens the passages, the other stops them up: therefore the Bath, without the anointing following, is utterly bad; the anointing without the Bath is half of all. Besides, the anointing amongst them was used only for debauch, or (if you take it at the belt) for health, but by no means in order to long life; and therefore they used them with all precious Ointments, which were good for deliciousness, but hurtful to our intention, in regard of their heat: So that Virgil seemeth not to have had amis, Ne Cofa liquide corrupmittur ushis Olivi. That correrent Cofa habat not supplantet the use of neat Oil-Olive.

Anointing with Oil conduceth to health, both in Winter, by the exclusion of the cold air, and in Summer, by detaining the spirits within, and prohibiting the Resolution of them, and keeping off the force of the air which is then most predatory.

Seeing the anointing with Oil is one of the most potent operations to long life, we have thought good to add some cautions, lest the health should be endangered: They are four, according to the four Inconveniences which may follow thereupon.

The first Inconvenience is, that by repressing sweats, it may ingerede different from those excrementitious humours. To this a remedy must be given by Purges and Clysers, that evacuation may be duly performed. This is certain, that evacuation by sweats commonly advanceth health, and derogateth from long life; but gentle Purges work upon the humours, not upon the spirits, as sweat doth.

The second Inconvenience is, that it may heat the body, and in time inflame it; for the spirits thus in, and not breathing forth, acquire heat. This inconvenience may be prevented, if the Diet most usitatly incline to the colder part, and that at times some proper cooling medicines be taken, of which we shall straight speak in the operation upon the blood.

The third is, that it may annoy the head; for all Opheias from without stirs back the vapours, and lends them up unto the head. This inconvenience is remedied by Purges, especially Clysers, and by flattering the mouth of the Romana strongly with Stipicks, and by combing and rubbing the head, and by washing it with convenient Lics, that something may exhale, and by not omitting competent and good exercises, that something also may perspire by the skin.

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The fourth Inconvenience is a more subtle Evil, namely, that the Spirit being detained by the closing up of the Pores, is likely to multiply it self too much; for when little is used forth, and new Spirit is continually ingendered, the Spirit increaseth too fast, and so preyeth upon the body more plentifully. But this is not altogether so; for all Spirit closed up is dull, (for it is blown and excited with motion as Flame is) and therefore it is less active, and less generative of self: Indeed it is thereby increased in Heat, (as Flame is) but flow in Motion. And therefore the remedy to this inconvenience must be by cold things, being sometimes mixed with Oil, such as are Ropes and Myrtles; for we must altogether disclaim hot things, as we said of Caffia.

Neither will it be unprofitable to wear next the body Garments that last in them some Cloths of a Vellum, or Cloths, not Aquafort, for they will extract the body lefs; such as are those of Woollen rather than those of Linen. Certainly it is manifest in the Spirits of Odours, that if you lay sweet powders amongst Linen, they will much sooner lose their smell than amongst Woollen. And therefore Linen is to be preferred for delicacy and neatness, but to be suspected for our Operation.

The old Irish, as soon as they fall sick, the first thing they do is to take the sheets off their beds, and to wrap themselves in the woollen cloaths.

Some report, that they have found great benefit in the conservation of their health by wearing Scarlet Waistcoats next their skin, and under their shirts, as well down to the nearer parts as on the upper.

It is also to be observed, that Air accustomed to the body doth lefs prey upon it than new Air and often changed; and therefore poor people, in small Cottages, who live always within the smell of the same chimney, and change not their seats, are commonly longest liv'd: notwithstanding, to other operations (especially for them whose spirits are not altogether dull,) we judge change of air to be very profitable; but a mean must be used, which may satisfection both sides. This may be done by removing our habitation four times a year, at continual and set times, unto convenient seats, that so the body may neither be in too much peregrination, nor in too much station. And touching the Operation upon the Exclusion of Air, and avoiding the predatory force thereof, thus much.

The Operation upon the Blood, and the Sanguifying Heat. 3.

The following Operations answer to the two precedent, and are in the relation of Puffoses and Affaves: for the two precedent intend this, that the Spirits and Air in their actions may be the less depredatory; and the two latter, that the Blood and Juice of the body may be the less depredable. But because the Blood is an irrigation or watering of the Juices and Members, and a preparation to them, therefore we will put the operation upon the Blood in the first place. Concerning this Operation we will propound certain Counsels, few in number, but very powerful in virtue. They are three.

First, there is no doubt, but that if the blood be brought to a cold temper, it will be so much the less digestible. But because the cold things which are taken by the mouth agree but ill with many other Intensions, therefore it will be best to find out some such things as may be free from these inconveniences. They are two.

The first is this: Let there be brought into use, especially in youth, (Clefts, not purging at all, or abdtering, but only cooling, and somewhat opening:) those are approved which are made of the Juices of Lettuce, Purslane, Liver wort, Houseleek, and the Mustage of the feed of Flea wort, with some temperate opening decoction, and a little
The History of Life and Death.

little Camphire: but in the declining age let the Hoolestic and Enulstone be left out, and the juices of forage and Endive, and the like, be put in their rooms. And let these Chysters be retained, if it may be, for an hour or more.

The other is this. Let there be in use, especially in Summer, baths of fresh water, and but Luke-warm, altogether without Enulmass, as Mallows, Mercury, Milk, and the like; rather take new evolve in some good quantity, and Repe.

But (that which is the principal in this intention, and new) we advise that before the bathing of the body be anointed with Oil, with some thickenes, whereby the quality of the cooling may be received, and the water excluded: yet let not the pores of the body be shut too close; for when the outward cold cloath the body too strongly, it is so far from furthering coolnes, that it rather forbids, and sits up heat.

Like unto this is the use of Bladders, with some decoctions and cooling juices, applied to the inferior region of the body, namely, from the ribs to the privy parts; for this also is a kind of bathing, where the body of the liquor is for the most part excluded, and the cooling quality admitted.

The third counsel remaineth, which belongeth not to the quality of the blood, but to the substance thereof, that it may be made more firm and leas dissipable, and such, as the heat of the spirit may have the less power over it.

And as for the use of Filings of Gold, Leaf-gold, Powder of Pearls, Precious Stones, Coral, and the like, we have no opinion of them at this day, unless it be only, as they may satisfy this present Operation. Certainly, seeing the Arabian, Grecians, and modern Physicians have attributed such virtues to these things, it cannot be altogether Nothing which so great men have observed of them. And therefore omitting all fantastic opinions about them, we do verily believe, that if there could be some such thing conveyed into the whole mass of the blood in minute and fine portions, over which the spirits and heat should have little or no power, absolutely it would not only reft Interception, but Operation also, and be a most effectual means to the prolongation of life. Nevertheless in this thing several cautions are to be given. First, that there be a most exact con-commitance. Secondly, that such hard and solid things be void of all malignant qualities, left while they be dispersed and lurk in the veins, they breed some ill inconvenience. Thirdly, that they be never taken together with meats, nor in any such manner as they may stick long, lest they beget dangerous obstructions about the Mefenteroy. Lastly, that they be taken very rarely, that they may not congregate and knot together in the veins.

Therefore let the manner of taking them be fasting, in the morning, a little Oil of Almonds mingled therewith, Excrifice used immediately upon the taking of them.

The simples which may satisfy this Operation are, in stead of all, Gold, Pearls, and Corals; for all Metals, except Gold, are not without some malign ant quality in the dissolutions of them, neither will they be better to that exquisite thinness that Leaf-gold hath. As for all glassy and transparent jewels, we like them not, (as we said before) for fear of Carlotism.

But, in our judgment, the safer and more effectual way would be by the use of Woods in Infusions and Decoctions; for there is in them sufficient to cause firmness of blood, and not the like danger for breeding obstructions; but especially, because they may be taken in meat and drink, whereby they will find the more ease entrance into the veins, and not be avoided in excrements.

The woods fit for this purpose are Sanders, the Oak and Vine. As for all hot woods or something Reperime, we reject them: notwithstanding you may add the woody flaky of Reperime dried, for Reperime is a Shrub, and exceedeth in age many Trees; also the woody flaky of Ivy, but in such quantity as they may not yield an unpleasing taffe.

Let the woods be taken either boiled in Broths, or infused in Must or Ale before they leave working; but in broths (as the custom is for Quercus and the like) they would be infused a good while before the boiling, that the firmer part of the wood, and not that only which lieth loosely, may be drawn forth. As for Ale, though it be used for Cups, yet we like it not. And touching the Operation upon the Blood thus much.
The Operation upon the Juices of the Body. 4.

The History.

1. There are two kinds of Bodies (as was said before in the Inquisition Touching Inanimates) which are hardly consumed, Hard things and Fat things; as is seen in Metals and Stones, and in Oil and wax.

2. It must be order'd therefore, that the juice of the body be somewhat hard, and that it be farty or subfature.

3. As for hardness, it is caus'd three ways: by Aliment of a firm nature, by cold condensing the skin and flesh, and by Exercise, binding and compacting the juices of the body, that they be not soft and frothy.

4. As for the Nature of the Aliment, it ought to be such as is not easily dissipable; such as are Beef, Swine's flesh, Deer, Goat, Kid, Swan, Goose, Ring-dove, especially if they be a little powdered; Fish like wife salted and dried, Old Cheese, and the like.

5. As for the Bread: Oaten-bread, or bread with some mixture of Pease in it, or Rye-bread, or Early-bread, are more solid than Wheat-bread, and in Wheat-bread, the course Wheat-bread is more solid than the pure Mancchet.

6. The Inhabitants of the Orcades, which live upon salted fish, and generally all Fish-eaters, are long-liv'd.

7. The Monks and Hermits which fed sparingly, and upon dry Aliments, attained commonly to a great age.

8. Also pure water usu'ally drunk makes the juices of the body less frothy? unto which if, for the dulness of the spirits, (which no doubt in VWater are but a little penetrative) you add a little Nitre, we conceive it would be very good. And touching the firmness of the Aliment thus much.

9. As for the Conjunction of the skin and flesh by cold: They are longer-liv'd for the most part that live abroad in the open air, than they that live in Houses; and the Inhabitants of the cold countries, than the Inhabitants of the hot.

10. Great store of clothes, either upon the bed or back, do resolve the body.

11. Washing the body in cold water is good for length of life; for hot Baths is naught. Touching baths of Astringent Mineral Waters we have spoken before.

12. As for Exercise; an idle life doth manifestly make the flesh soft and dissipable: robust exercise (so it be without over-much sweating or weariness) maketh it hard and compact. Also exercise within cold Waters, as swimming, is very good; and generally exercise abroad is better than that within houses.

13. Touching Frigations, (which are a kind of exercise) because they do rather call forth the Aliment than harden the flesh, we will inquire hereafter in the due place.

14. Having now spoken of hardening the juices of the body, we are to come next to the Oleosity and Fatiness of them, which is a more perfect and potent Intention than Inulation, because it hath no inconvenience or evil annexed. For all those things which pertain to the hardening of the juices are of that nature, that while they prohibit the absorption of the Aliment, they also hinder the operation of the same; whereby it happens, that the same things are both propitious and ad-verse to length of life: but those things which pertain to making the juices Oily and Rofeist, help on both sides, for they render the Aliment both less dissipable and more reparable.

15. But whereas we say that the Juice of the body ought to be Rofeist and Fat, it is to be noted that we mean it not of a visible Fat, but of a Dewiness dispersed, or (if you will call it) Radical in the very substance of the body.

16. Neither again let any man think, that Oil or the Fat of Meats or Marrow do engender the life, and satisfy our intention: for those things which are once perfect are not brought back again; but the Aliments ought to be such, which after digestion and maturation do then in the end engender Oleosity in the Juices.

17. Neither again let any man think, that Oil or Fat by itself and simple is hard of dissipation; but in mixture it doth not retain the same nature: for as Oil by itself is much more lasting in consuming than Water; so in Paper or Linen it sticketh longer, and is later dried, as we noted before.
To the Irroration of the body, roasted meats or baked meats are more effectual than boiled meats, and all preparation of meat with water is inconvenient: besides, Oil is more plentifully extracted out of dry bodies than out of moist bodies.

Generally, to the Irroration of the body much use of sweet things is profitable, as of Sugar, Honey, sweet Almonds, Pine-apples, Figs, Dates, Raisins of the Sun, Coranta, Figs, and the like. Contrarily, all sour, and very salt, and very biting things are opposite to the generation of Rected Juice.

Neither would we be thought to favour the Maniches, or their diet, though we commend the frequent use of all kinds of Seeds, Kernels, and Roots, in Meats or Sauces, considering all Bread (and Bread is that which maketh the Meat firm) is made either of Seeds or Roots.

But there is nothing makes so much to the Irroration of the body, as the quality of the Drink, which is the convey of the Meat; therefore let there be in use such Drinks as without all ceremony or sooner are notwithstanding subtle: such are those Wines which are (as the old woman said in Plantus) vetustate edentula, toothless with age, and Aë of the same kind. But Mead (as we suppose) would not be ill if it were strong and old: but because all Honey hath in it some sharp parts, (as appears by that sharp water which the Cro-Miæs extract out of it, which will dissolve metals) it were better to take the same portion of Sugar, not lightly infused in it, but so incorporated as Honey unless to be in Mead, and to keep it to the age of a year, or at least six months, whereby the Water may lose the crudity, and the Sugar acquire subtlety.

Now ancients in Wine or Beer hath this in it, that it engenders subtlety in the parts of the Liquor, and ceremony in the Spirits, whereof the first is profitable, and the second hurtful. Now to rectify this evil commixture, let there be put into the vessel, before the Wine be separated from the Must, Swines-feb or Deers-feb well boiled, that the Spirits of the Wine may have wherewith to ruminate and feed, and so ly abide their morbidity.

In like manner, if Aë should be made not only with the grains of Wheat, Barly, Oates, Peafe, and the like; but also should admit a part (suppose a third part to these grains) of some fat roots, such as are Potado-root, Pith of Archeches, Burro-root, or some other sweet and eculent roots; we suppose it would be a more useful drink for long life than Aë made of grains onely.

Also such things as have very thin parts, yet notwithstanding are without all ceremony or morbatly, are very good Sallets: which virtue we find to be in some few of the Flowers: namely, Flowers of Ivy, which infused in Vinegar are pleasant even to the taste; Marigold leaves, which are used in Broths; and Flowers of Betony. And touching the operation upon the Juncers of the Body thus much.

The Operation upon the Bowels for their Extrusion of Aliment. 5.

The History.

What those things are which comfort the Principal Bowels, which are the fountain of Concoctions, namely, the stomach, Liver, Heart and Brain, to perform their functions well, (whereby aliment is distributed into the parts, Spirits are dispersed, and the separation of the whole body is accomplished) may be derived from Physitian, and from their Prefcripts and Advice.

Touching the Spleen, Gall, Kidneys, Mefenteries, Guts and Lungs, we speak not, for these are members ministering to the principal; and whereas speech is made touching health, they require sometime a most special consideration, because each of these have their diseases, which unless they be cured, will have influence upon the Principal Members. But as touching the prolongation of life, and repairation by aliments, and retardation of the incoction of old age; if the Concoctions and H
The History of Life and Death.

the principal Bowels be well disposed, the rest will commonly follow according to ones with.

And as for those things which, according to the different state of every man's body may be transferred into his Diet and the regimen of his life, he may collect them out of the Books of Physicians, which have written of the comforting and preferring the four Principal Members: For conservation of health hath commonly need of no more than some short courses of Physick; but length of life cannot be hoped without an orderly diet, and a constant use of physic and medicines. But we will propound some few, and those the most effectual and prime directions.

The Stomach (which, as they say, is the Master of the house, and whole strength and goodness is fundamental to the other concoctions) ought so to be guarded and confirmed, that it may be without intemperance hot; next, abstinente or bond, not loose; furthermore clean, not surcharged with foul Humours, and yet (in regard it is nourished from itself, not from the veins) not altogether empty or hunry: lastly, it is to be kept ever in appetite, because appetite that happens digestion.

I wonder much how that same *Calidum bibere*, to drink warm drink, (which was in use amongst the Ancients) is laid down again. I knew a Physician that was very famous, who in the beginning of dinner and supper, would usually eat a few spoonfuls of very warm broth with much greediness, and then would presently with that it were out again, saying, *He had no need of the broth, but only of the warmth.*

I do verily conceive it good, that the first draught either of *wine*, or *ale*, or any other drink, (to which a man is most accustomed) be taken at supper warm.

*Wine* in which *Gold* had been quenched, I conceive, would be very good once in a meal; not that I believe the *Gold* conferreth any vertue thereunto, but that I know that the quenching of all Metals in any kind of liquor doth leave a moxt potente Affraction: Now I chuse *Gold*, because besides that Affraction which I desire, it leaveth nothing else behind it of a metallic impression.

I am of opinion, that the tops of bread dipped in wine, taken at the midst of the meal, are better than wine itself; especially if there were infused into the wine in which the tops were dipped *Rosemary* and *Citron-pills*, and that with *Sugar*, that it may not slip too fast.

It is certain that the use of *Quinces* is good to strengthen the stomach; but we take them to be better if they be used in that which they call *Quiddens of Quinces*, than in the bodies of the *Quinces* themselves, because they lie heavy in the stomach. But those *Quiddens* are best taken after meals, alone; before meals, dipped in Vinegar.

Such things as are good for the stomach above other simples are these: *Rosemary, Elecampane, Maffick, wormwood, Sage, Mint.*

I allow Pills of *Aloes*, *Maffick* and *Saffron* in Winter time, taken before dinner; but so, as the *Aloes* be not only oftentimes wafted in *Rose water*, but also in *Vinegar* in which *Tragaecinh* hath been infused, and after that be macerated for a few hours in Oil of *Sweet Almonds* new drawn, before it be made into Pills.

*Wine* or *Ale* wherein *Wormwood* hath been infused, with a little *Elecampane* and yellow *Saunder*, will do well, taken at times, and that especially in Winter.

But in Summer, a draught of *White-wine* allayed with *strawberry-water*, in which *Wine Powder of Pearls* and of the shells of *Corals*, exquisitely beaten and (which may perhaps seem strange) a little *chalk* have been infused, doth excellently refresh and strengthen the stomach.

But generally, all *Dranghts* in the morning (which are but too frequently used) of cold things, as of Juices, Decoctions, Whey, Barly-waters, and the like, are to be avoided, and nothing is to be put into the stomach falling which is purely cold. These things are better given, if need require, either at five in the afternoon, or else an hour after a light breakfast.

Often fastings are bad for long life; besides, all thirst is to be avoided, and the stomach is to be kept clean, but always moist.

*Oil of Oliver* new and good, in which a little *Methridate* hath been dissolved, anointed upon the back-bone, just against the mouth of the stomach, doth wonderfully comfort the stomach.

A small bag filled with locks of Scarlet-wool steeped in Red-wine, in which *Myrrh,*
The History of Life and Death.

Myrtle, and Citron-poll, and a little saffron have been infused, may be always worn upon the stomach. And touching those things which comfort the stomach this much, seeing many of those things also which serve for other operations are helpful to this.

The Liver, if it be preferred from Torrefaction, or Desecration, and from obstruction, it needeth no more; for that looseness of it which begeteth Agues is plainly a disease, but the other two old age approaching induceth.

Hereunto appertain most especially those things which are set down in the Operation upon the Blood: we will add a very few things more, but those selected.

Principally let there be in use the Wine of sweet Pomegranets, or, if that cannot be had, the juice of them newly expressed; let it be taken in the morning with a little Sugar, and into the glass into which the Expression is made put a small piece of Citron-poll green, and three or four whole Cloves: let this be taken from February till the end of April.

Bring also into use above all other Herbs Water-cress, but young, not old; they may be used either raw in Sallets, or in Broths, or in Drinks: and after that take Spoon-wort.

Aliet, however washed or corrected, is hurtful for the Liver, and therefore it is never to be taken ordinarily. Contrariwise, Rhubarb is sovereign for the Liver, so that these three cautions be interposed. First, that it be taken before meat, left it dry the body too much, or leave some impressions of the Supplicity thereof. Secondly, that it be macerated an hour or two in Oil of sweet Almonds, new drawn, with Rose-water, before it be infused in Liquor, or given in the proper substance. Thirdly, that it be taken by turns, one while simple, another while with Tartar, or a little Bar-salt, that it carry not away the lighter parts only, and make the mafs of the Humours more obstruente.

I allow Wine, or some decoction with Steel, to be taken three or four times in the year, to open the more strong obstructions; yet so, that a draught of two or three spoonsfuls of Oil of sweet Almonds, new drawn, ever go before, and the motion of the Body, especially of the arms and sides, constantly follow.

Swepted Liquors, and that with some fametvers, are principally, and not a little effectual to prevent the Arefations, and Saltness, and Torrefaction, and in a word, the Oldness of the Liver, especially if they be well incorporated with age. They are made of sweet Fruits and Roots, as namely, the Wines and Julips of Raisins of the Sun new, Feujubes, dried Figs, Dates, Parsnips, Potatoes, and the like, with the mixture of Lisos sometimes: also a Julip of the Indian grain, (which they call Maca) with the mixture of some sweet things, doth much to the same end. But it is to be noted, that the intention of preferring the Liver in a kind of softness and fatness, is much more powerful than that other which pertains to the opening of the Liver, which rather tendeth to health than to length of life, saving that that obstruction which induceth Torrefaction is as opposite to long life as those other Arefations.

I commend the Roots of Succory, Spinage and Beets cleared of their piths, and boiled till they be tender in Water, with a third part of white wine, for ordinary Sallets, to be eaten with Oil and Vinegar: also Asparagus, pith of Artichokes, and Burtr-roots boiled and served in after the same manner; also Broths in the Spring-time of Vine-buds, and the green blades of wheats. And touching the preferring of the Liver thus much.

The Heart receiveth benefit or harm most from the Air which we breath, from Vapours, and from the Affectious. Now many of those things which have been formerly spoken touching the Spirits may be transferred hither; but that indigested mass of Cordials collected by Physicians avails little to our intention: notwithstanding those things which are found to be good against Poylons may with good judgment be given to strengthen and fortifie the Heart, especially if they be of that kind, that they do not so much relieve the particular poylons as arm the heart and spirits against poylon in general. And touching the several Cordials, you may repair to the Table already set down.

The goodness of the Air is better known by experience than by signs. We hold that Air to be best where the Country is level and plain, and that lieth open on all sides, so that the foil be dry, and yet not barren or sandy; which puts forth
Wild Thyme, and Eye-bright, and a kind of Marjoram, and here and there stalks of Calaminis; which is not altogether void of wood, but conveniently set with some Trees for shade; where the Sweet-briar-rose smell both something Musky and Aromatically. If there be Rivers, we suppose them rather hurtful than good, unless they be very small, and clear, and gravelly.

It is certain that the morning air is more lively and refreshing than the evening air, though the latter be preferred out of delicacy.

We conceive also, that the air stirred with a gentle wind is more wholesome than the air of a serene and calm skie; but the best is, the wind blowing from the west in the morning, and from the North in the afternoon.

Odores are especially profitable for the comforting of the Heart, yet not so as through odour or odour were the prerogative of a good air: for it is certain, that as there are some Pestifential airs which finell not so ill as others that are less hurtful; so, on the contrary, there are some airs most wholesome and friendly to the spirit, which either finell not at all, or are less pleasing and fragrant to the fenfe. And generally, where the air is good, odours should be taken but now and then; for a continual odour, though never so good, is burthensome to the spirit.

We commend above all others (as we have touched before) odour of Plants, growing, and not plucked, taken in the open air: the principal of that kind are Violets, Gillyflowers, Vincas, Rose-flowers, Lime-tree-blossoms, Fire-buds, Honey-suckle, yellow Wall-flowers, Musk Roses, (for other Roses growing are full of their finells) Strawberry-leaves, especially dying, Sweet-briar, principally in the early Spring, Lignum, and Lavender flowered; and in the hotter Countries, Orange-tree, Citron-tree, Myrtle, Laurel: Therefore to walk or sit near the breath of these Plants would not be neglected.

For the comforting of the Heart, we prefer cool smells before hot finells: therefore the best perfume is, either in the morning, or about the heat of the day, to take an equal portion of Vinegar, Rose-water, and Careswine, and to pour them upon a Fire-pan somewhat heated.

Neither let us be thought to sacrifice to our Mother the Earth, though we advise, that in digging or ploughing the Earth for health, a quantity of Careswine be poured thereon.

Orange-flowers-water, pure and good, with a small portion of Rose-water and brisk wine, snuffed up into the nostrils, or put into the nostrils with a syringe, after the manner of an Errhine, (but not too frequently) is very good.

But champsing (though we have no Betel) or holding in the mouth only of such things as cheer the Spirits, (even daily done) is exceeding comfortable. Therefore for that purpose make Grains or little Cakes of Amber-greece, Musk, Lignum-Aloes, Lignum Rhodium, Orris Powder, and Roses; and let those Grains or Cakes be made up with Rose-water which hath passed through a little Indian assam.

The Vapours which arising from things inwardly taken do fortifie and cherishe the Heart ought to have these three properties: that they be Friendly, Clear, and Cooling; for hot vapours are naught; and wine itself, which is thought to have onely an heating vapour, is not altogether void of an Opiate quality. Now we call those vapours Clear which have more of the vapour than of the exhalation, and which are not finaky, or fulliginous, or unctuous, but moist and equal.

Out of that unprofitable rabble of Cordials, a few ought to be taken into daily diet: instead of all, Amber-greece, Saffron, and the grain of Kermae, of the hotter fort; Roots of Angelica and Barrage, Citrons, Sweet Marjoram, and Pear-manis, of the colder fort. Also that way which we said, both Gold and Pearl work a good effect, not only within the veins, but in their passage, and about the parts near the heart; namely, by cooling, without any malignant quality.

Of Bezoar-stone we believe well, because of many trials: but then the manner of taking it ought to be such, as the vertue thereof may more easily be communicated to the spirit: therefore we approve not the taking of it in Braths or Syrups, or in Rose-water, or any such like; but only in wine, Cinnamon-water, or the like distilled water, but that weak or small, not burning or strong.

Of the Affections we have spoken before; we only add this, That every Noble, and Resolute, and (as they call it) Heroical Defore, strengtheneth and inlarge the powers of the Heart. And touching the Heart thus much.
The History of Life and Death.

As for the Brain, where the Seat and Court of the Animal Spirits is kept, those things which were inquired before touching Opium, and Nitre, and the Subordinates to them both, also touching the procuring of placid sleep, may likewise be referred hither. This also is most certain, that the Brain is in some sort in the custody of the Stomach; and therefore those things which comfort and strengthen the Stomach do help the Brain by consent, and may no less be transferred hither. We will add a few Observations, three Outward, one Inward.

We would have bathing of the Feet to be often used, at least once in a week: and the Bath to be made of Ice with Bay salt, and a little Sage, Chamomile, Fennel, Sweet-marjoram, and Pepper-wort, with the leaves of Angelica green.

We commend also a frame or Suffumigation every morning of dried Rosemary, Bay-leaves dried, and Lignum-Aloes: for all these Drugs oppress the head.

Especially care must be taken that no hot things be applied to the Head outwardly; such are all kind of Spices, the very Nutmeg not excepted: for those hot things we debafe them to the soles of the Feet, and would have them applied there only; but a light anointing of the Head with oil, mixed with Ropes, Myrtle, and a little Salt and Saffron, we much commend.

Not forgetting those things which we have before delivered touching Opium, Nitre, and the like, which so much confude the spirit; we think it not impertinent to that effect, that once in fourteen days blood be taken in the morning with three or four grains of Caffeina, and a little Angelica-saifed, and calamus, which both fortifie the brain, and in that aforesaid density of the substance of the spirit, (so necessary to long life.) add also a vivacity of motion and vigour to them.

In handling the Comforters of the four principal Bowels, we have propounded those things which are both proper and choice, and may safely and conveniently be transferred into Diets and Regiment of Life: for variety of Medicines is the Daughter of Ignorance; and it is not more true, that many Diseases have caus'd many Diseases, as the Proverb is, than this is true, that many Medicines have caus'd few Cures. And touching the Operation upon the principal Bowels for their Extraction of Aliments, thus much.

The Operation upon the Outward Parts for their Attraction of Aliment. 6.

The History.

Although a good Concoction performed by the Inward Parts be the principal towards a perfect Alimentation; yet the Actions of the Outward Parts ought also to concur; that like as the Inward Faculty tendeth forth and extrudeth the Aliment, so the Faculty of the Outward Parts may call forth and attract the same: and the more weak the Faculty of Concoction shall be, the more need there is of a concurring help of the Attractive Faculty.

A strong Attraction of the outward parts is chiefly caused by the motion of the Body, by which the parts being heated and comforted, do more cheerfully call forth and attract the Aliment unto themselves.

But this is most of all to be foreseen and avoided, that the same motion and heat which calls the new juice to the members, doth not again depoil the member of that juice wherewith it had been before refreshed.

Frications used in the morning serve especially to this Intention; but this must evermore accompany them, that after the Frication the part be lightly anointed with Oil, left the Attrition of the outward parts make them by Perspiration dry and juicelss.

The next is Exercise, (by which the parts constrict and chafe themselves) so it be...
The History of Life and Death.

be moderate, and which (as was noted before) is not swift, nor to the utmost strength, nor unto weariness. But in Exercise and Frigation there is the same reason and caution, that the body may not perspire or exhale too much: Therefore Exercise is better in the open air than in the house, and better in Winter than in Summer; and again, Exercise is not only to be concluded with Unction, as Frigation is, but in vehement Exercise Unction is to be used both in the beginning and in the end, as it was ancientsly to Champaigns.

That Exercise may resolve either the spirits or the juices as little as may be, it is necessary that it be used when the stomach is not altogether empty: and therefore that it may not be used upon a full stomach, (which doth much concern health) nor yet upon an empty stomach, (which doth no less concern long life) it is best to take a breakfast in the morning, not of any Physical Drugs, or of any Liquors or of Railsins, or of Figs, or the like; but of plain Meat and Drink, yet that very light, and in moderate quantity.

Exercises used for the irrigation of the members, ought to be equal to all the members; not (as Socrates said) that the Legs should move, and the Arms should rest, or on the contrary; but that all the parts may participate of the motion. And it is altogether requisite to long life, that the Body should never abide long in one posture, but that every half hour, at least, it change the posture, saving only in sleep.

Those things which are used to Mortification may be transferred to Purification: for both Hair-shirts, and Scourings, and all vexations of the outward parts, do fortifie the Attractive force of them.

Cardan commends Settling, even to let out Melancholy: but of this we have no experience; and besides, we have no good opinion of it, left, through the venemous quality of the Nettle, it may with often life breed Itches and other diseases of the skin. And touching the Operation upon the outward Parts for their Attraction of Aliments, thus much.

The Operation upon the Aliment it self for the Infusion thereof. 7.

The History.

The vulgar reproach touching many Dishes doth rather become a severe Reformer than a Physicin: or however it may be good for preservation of health, yet it is hurtful to length of life, by reason that a various mixture of Aliments, and somewhat heterogeneous, finds a passage into the veins and juices of the body more lively and cheerfully than a simple and homogeneous diet doth: besides, it is more forcible to stir up Appetite, which is the spur of Digestion. Therefore we allow both a full Table, and a continual change of Dishes, according to the Seasons of the year, or upon other occasions.

Also that opinion of the Simplicity of Meats without Sauces is but a simplicity of judgment; for good and well-chosen Sauces are the most wholesome preparation of Meats, and condite both to health and to long life.

It must be ordered, that with Meats hard of digestion be conjointed strong Liquors and Sauces that may penetrate and make way; but with Meats more easie of digestion, smaller Liquors and little Sauces.

Whereas we advised before, that the first Draught at Supper should be taken warm; now we add, that for the preparation of the stomach, a good draught of that Liquor (to which every man is most accustomed) be taken warm half an hour before meat also, but a little spiced, to please the taste.

The preparation of Meats, and Bread, and Drinks, that they may be rightly handled, and in order to this Intention, is of exceeding great moment howsoever it may seem a Mechanical thing, and favouring of the Kitchin and Buttery; yet it is of more consequence than those Fables of Gold and precious Stones, and the like.
The History of Life and Death.

The nourishing of the juices of the body by a moist preparation of the aliment, is a childish thing; it may be somewhat available against the fervours of diseases, but it is altogether adverse to solid alimentation. Therefore boiling of meats, as concerning our intention, is far inferior to roasting, and baking, and the like.

Roasting ought to be with a quick fire, and soon dispatched; not with a dull fire, and in long time.

All solid fleshes ought to be served in, not altogether fresh, but somewhat powdered or combed; the less Salt may be spent at the table with them, or none at all: for Salt incorporated with the meat before is better distributed in the body, then eaten with it at the table.

There would be brought into use several and good Macerations, and Infusions of Meats in convenient Liquors, before the roasting of them: the like whereof are sometime in use before they bake them, and in the Pickles of some Fishes.

But bearings, and as it were soureings, of flesh-meats before they be boiled, would work no small matter. We see it is confessed that Partridges and Pheasants killed with an Hank, also Rocks and Stags killed in hunting, (if they stand not out too long, eat better even to the table; and some Fishes scoured and beaten, become more tender and wholesome; also hard and four Peers, and some other Fruits, grow sweet with roasting them. It were good to practise some such beating and bruising of the harder kinds of Fleshes before they be brought to the fire; and this would be one of the best preparations of all.

Bread a little leavened, and very little salted, is best, and which is baked in an Oven thoroughly heated, and not with a faint heat.

The preparation of Drinks in order to long life shall not exceed one Precept. And as touching water-drinkers we have nothing to say; such a diet (as we said before) may prolong life to an indifferent term, but to no eminent length: but in other Drinks, that are full of spirit, (such as are wine, Ale, Mead, and the like) this one thing is to be observed and purposed, as the sum of all, That the parts of the Liquor may be exceeding thin and subtil, and the Spirit exceeding mild. This is hard to be done by age alone, for that makes the parts a little more subtil, but the spirits much more sharp and eager: therefore of the Infusions in the Vessels of some fat substance, which may restrain the acrimony of the spirits, counsel hath been given before. There is also another way without Infusion or Mixture; this is, that the Liquor might be continually agitated, either by carriage upon the Water, or by carriage by Land, or by hanging the vessels upon lines, and daily agitating them, or some such other way: for it is certain that this local motion doth both subtilize the parts, and doth so incorporate and compact the spirits with the parts, that they have no leisure to turn to souness, which is a kind of purgation.

But in extrem old age such a preparation of meats is to be made as may be almost in the middle way to Chymus. And touching the Distillations of Meats, they are mere toys; for the Nutritive part, at least the best of it, doth not ascend in Vapours.

The incorporating of meat and drink before they meet in the Stomach is a degree to Chymus: therefore let Chickens, or Partridges, or Pheasants, or the like, be taken and boiled in water with a little salt, then let them be cleansed and dried, afterward let them be infused in Must or Ale before it hath done working, with a little Sugar.

Also Grazies of meat, and the mincings of them small well season'd, are good for old persons; and the rather, for that they are destitute of the office of their Teeth in chewing, which is a principal kind of preparation.

And as for the helps of that defect, (namely, of the strength of Teeth to grind the meat) there are three things which may conduce thereunto. First, that new Teeth may put forth; that which seems altogether difficult, and cannot be accomplished without an inward and powerful restitution of the body. Secondly, that the joint be so confirmed by due strengthenings, that they may in some sort supply the office of the Teeth; which may possibly be effected. Thirdly, that the meat be so prepared, that ther shall be no need of chewing; which remedy is ready at hand.

We have some thought also touching the Quantities of the meat and drink, that the same taken in a larger quantity at some times is good for the irrigation of the body; therefore both great Feasting and free Drinkings are not altogether to be inhibited. And touching the Operation upon the Aliments and the preparation of them, thus much.
The Operation upon the last Act of Assimilation. 8.

Touching the last Act of Assimilation (unto which the three Operations immediately preceding chiefly tend) our advice shall be brief and single: and the thing itself rather needs Explication, than any various Rules.

I. It is certain, that all bodies are endued with some desire of Assimilating those things which are next them. This the rare and pneumatical bodies, as Flame, Spirit, Air, perform generously and with alacrity: on the contrary, those that carry a gross and tangible bulk about them, do but weakly, in regard that the desire of assimilating other things is bound in by a stronger desire of Rest, and containing themselves from motion.

Again, it is certain that the desire of assimilating being bound, as we said, in a gross body, and made ineffectual, is somewhat freed and stirred up by the heat and neighbouring spirits, so that it is then actuated: which is the only cause why Inanimatd assimilate not, and Animates assimilate.

This also is certain, that the harder the Constitution of the body is, the more doth that body stand in need of a greater heat to prick forward the assimilation: which falls out ill for old men, because in them the parts are more obfinate, and the heat weaker; and therefore either the obfimacy of their parts is to be softened, or their heat increased. And as touching the Malacification or mollifying of their members, we shall speak afterward, having also formerly propounded many things which pertain to the prohibiting and preventing of this kind of hardnes. For the other, touching the increasing of the heat, we will now deliver a single precept, after we have first assumed this Axiom.

The Act of assimilation (which, as we said, is excited by the heat circumfused) is a motion exceeding accurate, subtle, and in little; now all such motions do then come to their vigour, when the local Motion wholly ceaseth which difturbed it. For the Motion of Separation into homogeneal parts, which is in Milk, that the Cream should swim above, and the Whey sink to the bottom, will never work, if the Milk be never so little agitated; neither will any Putrefaction proceed in Water or mixt Bodies, if the fame be in continual Local Motion. So then, from this Assumption we will conclude this for the present Inquisition.

The Act it self of Assimilation is chiefly accomplished in Sleep and Rest, especially towards the morning, the distribution being finifh'd. Therefore we have nothing else to advise, but that men keep themselves hot in their sleep; and farther, that towards the morning there be a'd some Anointing, or hift tinted with Oil, such as may gently stir up heat, and after that to fall asleep again. And touching the last Act of Assimilation thus much.

The Operation upon the Inteneration of that which begins to be Arefied, or the Malacification of the Body. 9.

We have inquired formerly touching the Intencration from within, which is done by many windings and Circuits, as well of Alimentation as of Detaining the Spirit from issuing forth, and therefore is accomplished slowly. Now we are to inquire touching that Intencration which is from without, and is effected, as it were, suddenly; or touching the Malacification and Suppling of the Body.

The History.

In the Fable of restoring Pelias to youth again, Medea, when she feigned to do it propounded this way of accomplishing the fame, 'That the Old man's body should be cut into several pieces, and then boiled in a Cauldron with certain Medicaments. There may, perhaps, some boiling be required to this matter, but the cutting into pieces is not needful.'
Notwithstanding, this cutting into pieces seems, in some sort, to be useful, not with a knife, but with judgment. For whereas the Conscience of the baneful and Parts is very diverse, it is not fit that the Intercation of them both be not effected the same way, but that there be a Cure designed of each in particular, besides the things which pertain to the Intercation of the whole mass of the Body; of which, notwithstanding, in the first place.

This Operation (if perhaps it be within our power) is most likely to be done by Baths, Unctions, and the like; concerning which these things that follow are to be observed.

We must not be too forward in hoping to accomplish this matter from the Examples of those things which we see done in the Inhibitions and Intercations of non-natives, by which they are interinated, whereof we introduced some instances before: For this kind of operation is more safe upon Inanimates, because they attract and suck in the Liquor; but upon the bodies of Living creatures it is harder, because in them the motion rather tendeth outward and to the Circumference.

Therefore the Emollient Baths which are in use do little good, but on the contrary hurt, because they rather draw forth than make entrance, and resolve the structure of the body rather than consolidate it.

The Baths and Unctions which may serve to the present Operation (namely, of Intercating the body truly and really) ought to have three properties.

The first and principal is, That they consist of those things which in their whole substance are like unto the body and flesh of man, and which have a feeding and nursing virtue from without.

The second is, That they be mixed with such things as through the subtility of their parts may make entrance, and so intumesc and convey their nourishing virtue into the body.

The third is, That they receive some mixture (though much inferior to the rest) of such things as are Astringents; I mean not four or five things, but uncertain and comforting; that while the other two do operate, the exhaling out of the body, which destroyleth the virtue of the things intercating, may (as much as is possible) be prohibited; and the motion to the inward parts, by the Astringion of the skin and closing of the passages, may be promoted and furthered.

That which is most conformable to the body of man is warm Blood, either of man, or of some other living creature: but the device of Feces, touching the sucking of blood out of the arm of a wholesome young man, for the restoracion of strength in old men, is very frivolous; for that which nourisheth from within ought no way to be equal or homogeneal to the body nourished, but in some sort inferior and subordinate, that it may be converted: but in things applied outwardly, by how much the substance is liter, by so much the content is better.

It hath been anciently received, that a Bath made of the Blood of Infants will cure the Leper, and heal the flesh already putrefy'd; insomuch that this thing hath begot envy towards some Kings from the common people.

It is reported that Heracleitus, for cure of the Dropsey, was put into the warm belly of an ox newly slain. They use the blood of Kine to cure the disease called St. Anthony's Fire, and to restore the blood and skin.

An Arm or other Member newly cut off, or that upon some other occasion will not leave bleeding, is with good success put into the belly of some creatures newly ripped up, for it worketh potently to staunch the blood; the blood of the member cut off by consent sticking in, and vehemently drawing to it self, the warm blood of the creature them, whereby it self is stopped and retires.

It is much used in extreme and desperate diseases to cut in two young Pigeons, yet living, and apply them to the soles of the feet, and to shift them one after another, whereby sometime there followeth a wonderful case. This is imputed vulgarly as if they should draw down the malignity of the disease; but howsoever, this application goeth to the Head, and comforteth the Animal Spirits.

But these bloody Baths and Unctions seem to us flat and odious: let us search out some others, which perhaps have left lothomencis in them, and yet no less benefit.
Next unto warm Blood, things alike in substance to the Body of a man are nutritious: 

17. fat fleshes of Oxen, Swine, Deer; others amongst fishes; Milk, Butter, Yolks of Eggs, Flowers of H heat, sweet wine, either Sugred, or before it be fined.

18. Such things as we would have mixed to make repulsion are, instead of all, Salts, especially Ray sat; also Wine (when it is full of spirit) makest entrance, and is an excellent Convoy.

19. Astringent of that kind which we described, namely, unctuous and comfortable things, are Saffion, Mastic, Myrrhe, and Myrtle berries. 

20. Of these parts, in our judgment, may very well be made such a Bath as we design: Physicians and Pottery will find out better things hereafter.

21. But the Operation will be much better and more powerful, if such a Bath as we have propounded (which we hold to be the principal matter) be attended with a fourfold Course and Order.

22. First, that there go before the Bath a Fritiation of the body, and an Anointing with oil, with some thickening subsance, that the virtue and moistening heat of the bath may pierce the body, and not the watry part of the Liquor. Then let the bath follow, for the space of some two hours. After the Bath, let the body be Emplastered with Mascick, Myrrhe, Tragacanth, Diapalma, and Saffion; that the perspiration of the body may (as much as is possible) be inhibited, till the supple matter be by degrees turned into solid: This to be continued for the space of twenty four hours or more. Lastly, the Emplastering being removed, let there be an anointing with oyl mixed with Salt and Saffion. And let this bath, together with the Emplastering and Unction, (as before) be renewed every fifth day. This Malacification or suppling of the body be continued for one whole month.

23. Also during the time of this Malacification, we hold it useful and proper, and according to our intention, that men nourish their bodies well, and keep out of the cold air, and drink nothing but warm drink.

24. Now this is one of those things (as we warned in general in the beginning.) whereof we have made no trial by Experiment, but only let it down out of our aiming and levelling at the end: For having set up the Mark, we deliver the Light to others.

25. Neither ought the warmest and cherishing of living bodies to be neglected. Viciniss faith, and that seriously enough, That the laying of the young Maid in David's bosom was wholesome for him, but it came too late. He should also have added, That the young oyle, alter the manner of the Persian Virgin, ought to have been anointed with Myrrhe, and such like, not for deliciousness, but to increase the virtue of this cherishing by a living body.

26. Barbarossa, in his extrem old age, by the advice of a Physician, a few, did continually apply young Boys to his stomack and belly, for warmth and cherishing: also some old men lay Whelps (creatures of the hottest kind) close to their stomachs every night.

27. There hath gone a report, almost undoubted, and that under several names, of certain men that had great Noses, who being weary of the derivation of people, have cut off the bunches or hillocks of their Noses, and then making a wide gash in their arms, have held their Noses in the place for a certain time, and so brought forth fair and comely Noses: Which if it be true, it shews plainly the content of flesh unto flesh, especially in live fleshes.

28. Touching the particular Intercration of the principal Bowels, the Stomach, Lungs, Liver, Hearts, Brain, Marrow of the Back bone, Guts, Reins, Gall, Veins, Arteries, Nerves, Cartilages, Bones, the Intercration and Direction would be too long seeing we now set not forth a Practick, but certain Indications to the Practick.
The Operation upon the Purging away of old Juice, and Supplying of new Juice; or of Renovation by Turns. 10.

The History.

Although those things which we shall here let down have been, for the most part, spoken of before; yet because this Operation is one of the principal, we will handle them over again more at large.

It is certain that Draught-Oxen which have been worn out with working, being put into fresh and rich pastures, will gather tender and young flesh again: and this will appear even to the taste and palate; so that the Intercration of flesh is no hard matter. Now it is likely that this Intercration of the flesh being often repeated, will in time reach to the Intercration of the Bones and Membranes, and like parts of the body.

It is certain that Diets which are now much in use, principally of Caracca and of Sarsaparilla, China, and Safffras, if they be continued for any time, and according to strict rules, do first expel the whole juice of the body, and after consume it and drink it up. Which is most manifest, because that by these Diets the French-Pox, when it is grown even to an hardness, and hath eaten up and corrupted the very narrow of the body, may be effectually cured. And further, because it is manifest that men who by these diets are brought to be extreme lean, pale, and as it were ghosts, will soon after become fat, well-coloured, and apparently young again. Wherefore we are absolutely of opinion, that such kind of diets in the decline of age, being used every year, would be very useful to our Intention; like the old skin or spoil of Serpents.

We do confidently affirm, (neither let any man reckon us among those Hereticks which were called Cathari) that often Purges, and made even familiar to the body, are more available to long life than Exercises and Sweats; and this must needs be so, if that be held, which is already laid for a ground, That Intercation of the body, and Opception of the passages from without, and Exclusion of air, and Detaining of the spirit within the mass of the body, do much conduc to long life. For it is most certain, that by Sweats and outward Perpirations not only the Humours and excrementitious vapours are exhaled and consumed, but together with them the juices also and good spirits, which are not so easily repaired: but in Purges (unless they be very immoderate) it is not so, seeing they work principally upon the Humors. But the best Purges for this intention are those which are taken immediately before meat, because they dry the body lefs; and therefore they must be of those Purgers which do least trouble the belly.

These Intentions of the Operations which we have propounded (as we conceive) are most true, the Remedies faithful to the Intentions. Neither is it credible to be told (although not a few of these Remedies may seem but vulgar) with what care and choice they have been examined by us, that they might be (the Intention not at all impeached) both safe and effectual. Experience, no doubt, will both verify and promote these matters. And such, in all things, are the works of every prudent counsel, that they are Admirable in their Effects; Excellent also in their Order, but seeming Vulgar in the Way and Means.

The Porches of Death.

We are now to enquire touching the Porches of Death, that is, touching those things which happen not to men at the point of Death, both a little before and after: that seeing there are many Paths which lead to Death, it may be understood in what Common
The History of Life and Death.

way they all end, especially in those Deaths which are caused by Indigence of Nature rather than by Violence: although something of this latter also must be inferred, because of the connexion of things.

The History.

1. The living Spirit stands in need of three things that it may subsist: Convenient Motion, Temperate Refrigeration, and Fat Alements. Flame seems to stand in need but of two of these; namely, Motion and Alement; because Flame is a simple substance, the Spirit a compounded, in so much that if it approach somewhat too near to a flamy nature, it overthrows it self.

2. Also Flame by a greater and stronger Flame is extinguished and slain, as Aristotle well noted, much more the Spirit.

3. Flame, if it be much compressed and frighted, is extinguished: as we may see in a Candle having a Glass cast over it; for the Air being dilated by the heat, doth con- trude and thrust together the Flame, and so lesseneth it, and in the end extinguisheth it; and fires on hearth's will not flame if the fuel be thrust close together without any space for the flame to break forth.

4. Also things fired are extinguished with compression; as if you press a burning coal hard with the Tongs or the foot, it is frighted extinguished.

5. But to come to the Spirit: if Blood or Phlegm get into the Ventricles of the Brain, it caufeth sudden death, because the Spirit hath no room to move it self.

6. Also a great blow on the head induceth sudden death, the Spirits being frighted within the Ventricles of the Brain.

7. Opium and other strong Stupesfallites do coagulate the Spirit, and deprive it of the motion.

8. A venomous Vapour, totally abhorred by the spirit, caufeth sudden death: as in deadly poisons, which work (as they call it) by a specifical malignity; for they strike a loathing into the Spirit, that the spirit will no more move it self, nor rise against a thing so much detested.

9. Also extreme Drunkenness or extreme Feeding sometime cause sudden death, seeing the spirit is not onely oppressed with overmuch condenfing, or the malignity of the vapour, (as in Opium and malignant poisons) but also with the abundance of the Vapours.

10. Extreme Grief or Fear, especially if they be sudden, (as it is in a sad and unexpected message) cause sudden death.

11. Not only over-much Compression, but also over-much Dilatation of the spirit, is deadly.

12. Joys excessive and sudden have bereft many of their lives.

13. In greater Evacuations, as when they cut men for the Drapie, the waters flow forth abundantly; much more in great and sudden fluxes of blood oftentimes prefent death followeth: and this happens by the mere flight of Vacuum within the body, all the parts following to fill the empty places, and amongst the rest the spirits themselves. For as for flow fluxes of blood, this matter pertains to the indigence of nourishment, not to the diffusion of the spirits. And touching the motion of the spirit so far, either compressed or diffused, that it bringeth death, thus much.

14. We must come next to the want of Refrigeration. Stopping of the breath caufeth sudden death, as in all suffocation or strangling. Now it seems this matter is not so much to be referred to the impediment of Motion, as to the impediment of Refrigeration; for air over-hot, though attracted freely, doth no les suffocate than if breathing were hindered; as it is in them who have been sometime suffocated with burning coals, or with char-coal, or with walls newly plastered in close chambers where a fire is made: which kind of death is reported to have been the end of the Emperor Jovinian. The like happeneth from dry Baths over heated, which was practised in the killing of Faustha, wife to Constantine the Great.

15. It is a very small time which Nature taketh to repeat the breathing, and in
The History of Life and Death.

which the desireth to expel the foggy air drawn into the Lungs, and to take in new, scarce the third part of a minute.

Again, the beating of the Pulse, and the motion of the Systole and Diastole of the heart, are three times quicker than that of breathing: insomuch that if it were possible that that motion of the heart could be stopped without stopping the breath, death would follow more speedily thereupon than by strangling.

Notwithstanding, use and custom prevail much in this natural action of breathing; as it is in the Delian Divers and Fishers for Pearl, who by long use can hold their breaths at least ten times longer than other men can do.

Among living Creatures, even of those that have Lungs, there are some that are able to hold their breaths a long time, and others that cannot hold them so long, according as they need more or less refrigeration.

Fishes need less refrigeration than Terrestrial Creatures, yet some they need, and take it by their Gills. And as Terrestrial Creatures cannot bear the air that is too hot or too close; so Fishes are suffocated in waters if they be totally and long frozen.

If the Spirit be assaulted by another heat greater than it itself, it is dissipated and destroyed: for it cannot bear the proper heat without refrigeration, much less can it bear another heat which is far stronger. This is to be seen in burning Fevers, where the heat of the putrefied humours doth exceed the native heat, even to extinction or disipation.

The want also and use of Sleep is referred to Refrigeration. For Motion doth attenuate and rarify the spirit, and doth sharpen and increase the heat thereof; contrarily, sleep feteth and restraineth the motion and gadding of the same: for though Sleep doth strengthen and advance the actions of the parts and of the livell's spirits, and all that motion which is to the circumference of the body; yet it doth in great part quiet and still the proper motion of the living Spirit. Now Sleep regularly is due unto humane nature once within four and twenty hours, and that for six or five hours at the least; though there are, even in this kind, sometimes miracles of Nature; as it is recorded of Acestes, that he slept not for a long time before his death. And as touching the want of Refrigeration for conserving of the spirit thus much.

As concerning the third Indigence, namely of Aliment, it seems to pertain rather to the parts than to the living Spirit; for a man may easily believe that the living Spirit subsisteth in Identity, not by succussion or renovation. And as for the reasonable Soul in man, it is above all question that it is not engendred of the Soul of the Parents, nor is repaired, nor can die. They speak of the Natural Spirit of living Creatures, and also of Vegetables, which differ from that other Soul essentially and formally. For out of the confusion of these that same transmigration of Souls, and innumerable other devices of Heaths and Hereticks have proceeded.

The Body of man doth regularly require Renovation by Aliment every day, and a body in health can scarce endure fasting three days together; notwithstanding use and custom will do much even in this case: but in linctness fasting is less grievous to the body. Alfo Sleep doth supply somewhat to nourishment; and on the other side Exercise doth require it more abundantly. Likewise there have some been found who sufficed themselves (almost to a miracle in nature) a very long time without meat or drink.

Dead Bodies if they be not intercepted by purgation, will subsist a long time without any notable Absumption; but Living bodies not above three days, (as we said) unless they be repaired by nourishment: which theweth that quick Absumption to be the work of the living Spirit, which either repairs it itself, or puts the parts into a necessity of being repaired, or both. This is testified by that also which was noted a little before, namely, that living Creatures may subsist somewhat the longer without Aliment if they sleep: now sleep is nothing else but a reception and retirement of the living Spirit into it.

An abundant and continual effusion of blood, which sometimes happeneth in the Hemorrhoids, sometimes in vomiting of blood, the inward Veins being unlocked or broken, sometimes by wounds, causeth sudden death, in regard that the blood of the Veins ministrith to the Arteries; and the blood of the Arteries to the Spirit.

The
The quantity of meat and drink which a man, eating two meals a day, receiveth into his body is not small; much more than he voideth again either by stool, or by urine, or by sweating. You will say, No marvel, seeing the remainder goeth into the juices and substantia of the body. It is true; but consider then that this addition is made twice a day, and yet the body aboundeth not much. In like manner, though the spirit be repaired, yet it grows not excessively in the quantity.

It doth no good to have the Aliment ready, in a degree removed, butto have it of that kind, and so prepared and supplied that the spirit may work upon it: for the staff of a Touch alone will not maintain the flame, unless it be fed with wick, neither can men live upon herbs alone. And from thence comes the Incendioth of old age, that though there be flesh and blood, yet the spirit is become so penurious and thin, and the juices and blood so heartless and obstinate, that they hold no proportion to Alimentation.

Let us now call up the accounts of the Needs and Indigences, according to the ordinary and usual course of nature. The Spirit hath need of opening and moving itself in the Ventricles of the Brain and Nerves, even continually, of the motion of the Heart every third part of a moment, of breathing every moment, of sleep and nourishment once within three days, of the power of nourishment commonly till eighty years be past: And if any of these Indigences be neglected, Death ensueth. So there are plainly three Porches of Death; Destitution of the Spirit in the Motion, in the Refrigeration, in the Aliment.

It is an error to think that the Living Spirit is perpetually generated and extinguished, as Flame is, and abideth not any notable time: for even Flame at self is not thine out of its own proper nature, but because it liveth amongst enemies, for Flame within Flame endureth. Now the Living Spirit liveth amongst friends, and all due Sequoies. So then, as Flame is a momentary substance, Air is a fixed substance, the Living Spirit is between both.

Touching the extinguishing of the Spirit by the destruction of the Organs (which is caused by Diseas and Violence) we inquire not now, as we foretold in the beginning, although that also endeth in the same three Porches. And touching the Form of Death it self theremuch.

There are two great forerunners of Death, the one sent from the Head, the other from the Heart; Convulsion, and the extreme labour of the Pulse; for, as for the deadly vicereign, it is a kind of Convulsion. But the deadly labour of the Pulse hath that unusual swiftness, because the Heart at the point of death doth so tremble, that the Sypho and Dipsak thereof are almost confounded. There is also conjoin'd in the Pulse a weakens and lowness, and oftentimes a great intermission, because the motion of the Heart faileth, and is not able to rise against the athlous fluidly or constantly.

The immediate proceeding signs of Death are, great unquietness and taffing in the bed, fumbling with the hands, catching and grasping hard, grating with the teeth, speaking hollow, trembling of the neather lip, paleness of the face, the memory confused, speechless, cold sweats, the body trembling in length, lifting up the white of the eye, changing of the whole visage (as the face sharp, eyes hollow, cheeks fallen) contraction and doubling of the colunels in the extreme parts of the body; in fome, shedding of blood or spere, shivering, breathing thick and short, falling of the neather chap, and suchlike.

There follow Death a privation of all sense and motion, as well of the Heart and Arteries as of the Nerves and Jowyns, an inability of the body to support it self upright, thinness of the Nerves and parts, extreme coldness of the whole body; after a little while, putrefaction and Rinking.

Eelis, serpentis and the Infeeta will move a long time in every part after they are cut asunder, inomuch that Country people think that the parts strive to joyne together again. Also birds will flutter a great while after their heads are pulled off; and the hearts of living creatures will pant a long time after they are plucked out. I remember I have seen the heart of one that was bowelled, as suffering for High Treason, that being cast into the fire, leapet at the first at least a foot and half in height, and after by degrees lower and lower, for the space, as I remember, of seven or eight minutes. There is also an ancient and credible Tradition of an ox lowing after his bowels were plucked out. But there is a more certain tradition of a man, who being under the
The History of Life and Death.

Executioner's hand for high Treason, after his Heart was plucked out and in the Executioner's hand, was heard to utter three or four words of prayer: which therefore we find to be more credence than that of the six in Sacrifice, because the friends of the party suffering do usually give a reward to the Executioner to dispatch his office with the more speed, that they may the sooner be rid of their pain; but in Sacrifices we see no cause why the Priest should be so speedy in his office.

For renewing those again which fell into sudden Swooning and Catatopics of afromentiments, (in which Fits many, without present help, would utterly expire) these things are used; Putting into their mouths Water distilled of Wine, which they call Hot-waters, and Cordial water, bending the body forwards, flopping the mouth and nostrils hard, bending or wringing the fingers, pulling the hairs of the beard or head, rubbing of the parts, especially the face and legs, sudden casting of cold water upon the face, thrashing out aloud and suddenly; putting Rose-water to the nostrils with vinegar in paintings; burning of Feathers or Cloth in the suffocation of the Mother: but especially a Frying-pan heated red hot is good in Apoplexies; also a close embracing of the body hath helped some.

Here have been many examples of men in new dead, either laid out upon the cold floor, or carried forth to burial; nay, of some buried in the earth, which notwithstanding have lived again, which hath been found in those that were buried (the earth being afterwards opened) by the bruising and wounding of their head, through the struggling of the body within the Coffin; whereof the most recent and memorable example was that of Joanna Scott, called the Sibyl, and a School-man, who being dug up again by his Servant, (unfortunately absent at his burial, and who knew his Master's manner in such fits) was found in that state: And the like happened in our days in the person of a Player, buried at Cambridge. I remember to have heard of a certain Gentleman, that would needs make trial in curiosity what men did feel that were hanged; so he fastened the Cord about his neck, raising himself upon a stool, and then letting himself fall, thinking it should be in his power to recover the stool at his pleasure, which he failed in, but was helped by a friend then present. He was asked afterward what he felt. He said he felt no pain, but first he thought he saw before his eyes a great fire and burning; then he thought he saw all black and dark; lastly it turned to a pale blew, or Sea-water green; which colour is also often seen by them which fall into Swoonings. I have heard also of a Physician, yet living, who recovered a man to life which had hanged himself; and had hanged half an hour, by Frigations and hot Baths: And the same Physician did profess, that he made no doubt to recover any man that had hanged so long, so his Neck were not broken with the first Swing.

The Differences of Youth and Old Age.

The adder of Man's Body is this: To be conceived, to be quickned in the womb, to be born, to suck, to be weaned, to feed upon Paps, to put forth Teeth the first time about the second year of age, to begin to go, to begin to speak, to put forth Teeth the second time about seven years of age, to come to Puberty about twelve or fourteen years of age, to be able for generation and the flowing of the Menstrua, to have hairs about the legs and arm-holes, to put forth a Beard; and thus long, and sometimes later, to grow in stature, to come to full years of strength and agility, to grow gray and bald; the Menstrua ceasing, and ability to generation, to grow decrepit and a monster with three legs, to die. Mean-while the Mind also hath certain periods, but they cannot be described by years, as to decay in the Memory, and the like; of which hereafter.

The differences of Youth and old Age are these: A young man's skin is smooth and plain, an old man's dry and wrinkled, especially about the forehead and eyes; a young man's flesh is tender and soft, an old man's hard; a young man hath strength and agility, an old man feels decay in his strength and is flow of motion; a young man hath...
hath good digestion, an oldman had; a young man's bowels are loose and succulent: an old man's hair and parched; a young man's body is erect and straight, an old man's bowing and crooked; a young man's limbs are steady, an old man's weak and trembling; the humours in a young man are choleric, and his blood inclined to heat, in an old man phlegmatic and melancholic, and his blood inclined to coldness; a young man ready for the act of love, an old man flow into it: in a young man the juices of his body are more rosid, in an old man more crude and watery; the spirit in a young man plentiful and boiling, in an old man scarce and jujue: a young man's spirit is dene and vigorous, an old man's eager and rare; a young man hath his senses quick and intense, an old man dull and decayed; a young man's teeth are strong and entire, an old man's weak, worn, and far out; a young man's hair is coloured, an old man's (of what colour fover it were) gray: a young man hath hair, an old man baldness; a young man's pulse is stronger and quicker, an old man's more confused and flower. The diseases of young men are more acute and curable, of old men longer and hard to cure; a young man's wounds soon close, an old man's later; a young man's cheeks are of a fresh colour, an old man's pale, or with a black bloud; a young man is left troubled with rheums, an old man more. Neither do we know in what things old men do improve as touching their body, five onely sometime in fatness; whereof the reason is soon given, Because old men's bodies doe neither perspire well, nor assimilate well: now Fatness is nothing else but an exuberance of nourishment above that which is voided by excrement or which is perfectly assimilated. Also some old men improve in the appetite of feeding by reason of the acid humors, though old men digest worst. And all these things which we have said, Physicians negligently enough will refer to the diminution of the Natural heat and Radical moisture, which are things of no worth for life. This is certain, Drines in the coming on of years doth forego (old nes): and bodies when they come to the top and strength of heat do decline in Drines, and after that follows Coldhens.

Now we are to consider the Affections of the Mind. I remember when I was a young man, at Porcher's in France I conversed familiarly with a certain French man, a witty young man, but something talkative, who afterwards grew to be a very eminent man: he was wont to inveigh against the manners of old men, and would say, That if their Minds could be seen as their Bodies are, they would appear no less deformed. Besides, being in love with his own wit, he would maintain, That the vices of old men's Minds have some correspondence and were parallel to the purifications of their Bodies: For the drines of their skin he would bring in Impudence; for the hardnes of their bowels, unmerschulnes: for the lippin de of their eyes, an evil Eye and Envie: for the talents down of their eyes, and bowing their body towards the earth, Abefion, (for, faith he, they look no more up to Heaven as they are wont) for the trembling of their members, Irrefolution of their decrees and light Inconstancy; for the bending of their fingers, as it were to catch. Raptity and covetousnes: for the buckling of their knees, Fearfulnes; for their wrinkles, Craftiness and Obliquity: and other things which I have forgotten. But to be serious, a young man is modest and shamefaced, an old man's forehead is hardened; a young man is full of bounty and mercy, an old man's heart is brawny: a young man is affected with a laudable emulation, an old man with a malignant envy; a young man is inclined to Religion and Devotion, by reason of his fervency and inexperience of evil, an old man cooleth in pity through the coldness of his charity, and long conversation in evil, and likewise through the difficulty of his belief; a young man's desires are vehement, an old man's moderate; a young man is light and moveable, an old man more grave and constant; a young man is given to liberality, and beneficence, and humanity, an old man to covetousness, wifdem for his own self, and seeking his own ends; a young man is confident and full of hope, an old man diffident and given to suspect most things; a young man is gentle and obsequious, an old man froward and disdainful; a young man is sincere and open-hearted, an old man caustious and close; a young man is given to desire great things, an old man to regard things necessary; a young man thinks well of the present times, an old man preferreth times past before them; a young man reverenceth his Superiors, an old man is more forward to tax them: And many other things, which pertain rather to Manners than to the present Inquisition. Withstanding old men, as in some things they improve in their Bodies, so also in their Minds, unless they be altogether out of date: namely, that as they are less apt for invention,
tion, so they excel in judgment, and prefer safe things and found things before precious; also they improve in Curiosity and Observation, for they seek the fruit of speech, while they are leftable for action: So as it was not absurd that the Poets feigned old Tiber to be turned into a Grasshopper.

Moveable Canons of the Duration of Life and Form of Death.

Canon I.

Consumption is not caused, unless that which is departed with by one body passeth into another.

The Explication.

Here is in Nature no Annihilation, or Reducing to Nothing: therefore that which is consumed is either resolved into Air, or turned into some Body adjacent. So we see a Spider, or Fly, or Amb in Amber, entombed in a more flately Monument than Kings are, to be laid up for Eternity, although they be but tender things, and soon diffipated: But the matter is this, that there is no air by, into which they should be resolved; and the substance of the Amber is so heterogeneous, that it receives nothing of them. The like we conceive would be if a Stick, or Root, or some such thing were buried in Quick-silver: also Wax, and Honey, and Gum have the same Operation, but in part only.

Canon II.

There is in every Tangible body a Spirit, covered and encompassed with the grosser parts of the body, and from it all Consummation and Dissolution hath the beginning.

The Explication.

No Body known unto us here in the upper part of the Earth is without a Spirit, either by Annihilation and Conscion from the heat of the Heavenly Bodies, or by some other way: for the Concavities of Tangible things receive not Vacuum, but either Air, or the proper Spirit of the thing. And this spirit whereof we speak is not some Virtue, or Energy, or Air, or a Tribe, but plainly a Body, rare and invisible; notwithstanding circumscribed by Place, Quantitative, Real. Neither again is that Spirit Air, (no more than Water is Water) but a body rarefied, of kin to Air, though much different from it. Now the grosser parts of bodies (being dull things, and not apt for motion) would last a long time; but the Spirit is that which troubleth, and plucketh, and undermineth them, and converteth the moisture of the body, and whatsoever is able to digest, into new Spirit; and then as well the pre-existing Spirit of the body as that newly made thine away together by degrees. This is best seen by the Dilation of the weight in bodies dried through Perforation: for neither which is issued forth was Spirit when the body was ponderous, neither was it not when it issued forth.

Canon III.

The Spirit issuing forth Drieth; Detained and working within either Melcheth, or Patretheth, or Vivitheth.

The Explication.

Here are four Proceeds of the Spirit, to Arefallion, to Colligation, Patrefallion, to Generation of bodies. Arefallion is not the proper work of the Spirit, but of the grosser parts after the Spirit issued forth: for then they contract themselves partly by their flight of Vacuum, partly by the union of the Homogenals: as appears in all things which are arefied by Age, and in the drier sort of bodies which have posseted the fire, as Bricks, Char coal, Bread. Colligation is the mere work of the Spirit: neither is it done but when they are excited by heat: for when the Spirits dilating themselves, yet not getting forth, do insinuate and disperse themselves among the grosser parts, and to make them soft and apt to run, as it is in Metalls and wax: for Metalls and all tenacious things are apt to inhibit the Spirit, that being excited.
The History of Life and Death.

Excited it issueth not forth. Putrefaction is a mixed work of the Spirits and of the grosser parts: for the Spirit (which before restrained and bridled the parts of the thing) being partly issueth forth and partly infeceth, all things in the body do dissolve and return to their Homogeneties, or (if you will) to their Elements: that which was Spirit in it is congregated to it self, whereby things putrefied begin to have an ill favour: the Oily parts to themselves, whereby things putrefied have that sliptinerneris and unfruitosity; the Warty parts also to themselves: the Dregs to themselves: whence followeth that confusion in bodies putrefied. But Generation or Vivification is a work also mixed of the Spirit and grosser parts, but in a far different manner: for the Spirit is totally detained, but it wicketh and moveth locally: and the grosser parts are not dissolved, but follow the motion of the spirit, and are, as it were, blown out by it, and extruded into divers figures, from whence cometh that Generation and organization: and therefore Vivification is always done in a matter tenacious and clammy, and again, yielding and soft, that there may be both a detection of the spirit, and also a gentle coifion of the parts, according as the spirit forms them. And this is seen in the matter as well of all Vegetables as of living Creatures, whether they be engendred of Putrefaction or of Sperm: for in all these things there is manifestly seen a matter hard to break through, easy to yield.

Canon IV.

In all living Creatures there are two kinds of Spirits: Liveless Spirits, such as are in bodies Inanimate; and a Vital Spirit superadded.

The Explication.

It was said before, that to procure long life the Body of man must be considered, first, as Inanimate, and not repaired by nourishment: secondly, as Animato, and repaired by nourishment: for the former consideration gives Laws touching Consumption, the latter touching Reparation. Therefore we must know that there are in humane flesh bones, membranes, Organs: finally, in all the parts such spirits diffused in the substance of them while they are alive, as there are in the same things (Flesh, Bones, Membranes, and the rest) separated and dead: such as also remain in a Carcass: but the Vital Spirit, although it ruleth them, and hath some conferent with them, yet it is far differing from them, being integral, and subsilting by it self. Now there are two special differences bewtisthe Liveless Spirits and the Vital Spirits. The one, that the Liveless Spirits are not continued to themselves, but are, as it were, cut off, and encompassed with a gross body which intercepts them; as Air is mixed with Snow or Froth: but the Vital Spirit is all continued to it self by certain Conduit-pipes through which it paseth, and is not totally intercepted. And this Spirit is two-fold also: the one branched, one way passing through small pipes, and, as it were, strings: the other hath a Cell also, so as it is not only continued to it self, but also congregated in an hollow space in reasonable quantity, according to the Analogy of the body, and in that Cell is the fountain of the Rivulets which branch from thence. That Cell is chiefly in the Ventricles of the Brain, which in the ignoble fort of creatures are but narrow, incomuch that the spirits in them seem scattered over their whole body rather than Celled; as may be seen in Serpents, Eels and Fishes, whereof every of their parts have long after they are cut affunder. Birds also lea a good while after, and are pulled off, because they have little heads and little Cells. But the nobler fort of creatures have those Ventricles larger, and Man the largest of all. The other difference bewtist the Spirits is, that the Vital Spirit hath a kind of enkindling, and is like a Wind or Breath compounded of Flame and Air, as the Juices of living creatures have both Oil and Water. And this enkindling minifeth peculiar motions and facultys: for the smoke which is inflammable, even before the flame conceived, is hot, thin and movable, and yet it is quite another thing after it is become flame: but the enkindling of the vital spirits is by many degrees gentler than the stoutest flame, as of Spirit of Wines, or otherwise; and besides, it is in great part mixed with an Aerial substance, that it should be a Mystery or Miracle, both of a Flammeous and Aereal nature.

Canon V.

The Natural Actions are proper to the several Parts, but it is the Vital Spirit that excites and sharpeneth them.
The History of Life and Death.

The Explanation.

The Actions or Functions which are in the several Members follow the nature of the Members themselves, (Attraction, Retention, Digestion, Assimilation, Separation, Excretion, Perforation, even Sense if it list) according to the propriety of the several organs, (the Stomach, Liver, Heart, Spleen, Gall, Brain, Eye, Ear, and the rest;) yet none of these Actions would ever have been actuated but by the vigour and presence of the Vital Spirit and heat thereof; as one Iron would not have drawn another iron, unless it had been excited by the Lead Stone, nor an Egg would ever have brought forth a Bird, unless the substance of the Hen had been actuated by the treading of the Cock.

Canon VI.

The liveless Spirits are next Consubstantial to Air; the vital Spirits approach more to the substance of Flame.

The Explanation.

The Explanation of the precedent fourth Canon is also a declaration of this present Canon; but yet further, from hence it is that all fat and oily things continue long in their Being; For neither doth the Air much pluck them, neither do they much desire to join themselves with Air. As for that conceit it is altogether vain, That Flame should be Air set on fire, seeing Flame and Air are no less Heterogeneous than Oil and Water. But whereas it is said in the Canons, that the Vital Spirits approach more to the substance of Flame; it must be understood, that they do this more than the liveless Spirits, not that they are more Flamy than Air.

Canon VII.

The Spirit hath two Desires; one of multiplying it self, the other of flying forth and congregating it self with the Connaturals.

The Explanation.

The Canon is understood of the liveless Spirits; for as for the second Desire, the Vital Spirit doth most of all abhor flying forth of the body, for it finds no Connatural here below to join withal: Perhaps it may sometimes fly to the outward parts of the body, to meet that which it loveth; but the flying forth, as I said, is abhorreth. But in the liveless Spirits each of these two Desires holdeth. For to the former this belongeth, Every Spirit seated amongst the grosser parts dwelleth unhappily; and therefore when it finds not a like unto it self, it doth so much the more labour to create and make a like, as being in a great solitude, and endeavour carelessly to multiply it self, and to prey upon the volatile of the grosser parts, that it may be encreased in quantity. As for the second Desire of flying forth, and betaking it self to the Air, it is certain that all light things (which are everlasting) do willingly go unto their like near unto them, as a Drop of water is carried to a Drop, Flame to Flame; but much more this is done in the flying forth of Spirit into the Air ambient, because it is not carried to a particle like unto it self; but also as unto the Globe of the Connaturals. Mean-while this is to be noted, That the going forth and flight of the Spirit into Air is a redoubled Action, partly out of the appetite of the Spirit, partly out of the appetite of Air; for the common air is a needy thing, and receiveth all things speedily, as Spirit, Odours, Beams, Sounds, and the like.

Canon VIII.

Spirit detained, if it have no possibility of begetting new spirits, it increateth the grosser parts.

The Explanation.

Generation of new Spirits is not accomplished but upon those things which are in some degree near to spirit, such as are humid bodies. And therefore if the grosser parts (amongst which the Spirit convergeth) be in a remote degree, although the Spirit cannot convert them, yet (as much as it can) it weakneth, and loseth, and subdueth them, that seeing it cannot increase in quantity, yet it will dwell more at large, and live amongst good neighbours and friends. Now this Abhorreth is most useful to our End, because it tendeth to the Inteneration of the obstinate parts by the detention of the Spirit.

Canon IX.

The Inteneration of the harder parts cometh to good effect, when the Spirit neithcr flyth forth, nor begetteth new Spirit.
The History of Life and Death.

The Explication.

This Canon solveth the knot and difficulty in the Operation of Intenrating by the Detention of the Spirit: for if the spirit not flying forth wasteth all within, there is nothing gotten to the intenrating of the parts in their subsistence, but rather they are dissolved and corrupted. Therefore together with the Detention the Spirits ought to becooled and restrained, that they may not be too active.

Canon X.

The heat of the Spirit to keep the body fresh and green, ought to be Robust, not Eager.

The Explication.

Also this Canon pertaineth to the solvings of the knot aforesaid, but it is of a much larger extent, for it setteth down of what temperament the heat in the body ought to be for the obtaining of Long life. Now this is useful, whether the spirits be detained, or whether they be not. For howsoever the heat of the spirits must be such, as it may rather turn it self upon the hard parts than waste the soft; for the one Defecateth, the other intenrating. Besides, the same thing is available to the wellperfecting of Assimilation; for such an heat doth excellently excite the faculty of Assimilation, and withall doth excellently prepare the matter to be Assimilated. Now the properties of this kind of heat ought to be these. First, that it be slow, and heat not suddenly: Secondly, that it be not very intense, but moderate: Thirdly, that it be equal, not incomposed, namely, intending and remitting it self: Fourthly, that if this heat meet any thing to refist it, it be not easily suffocated or languish. This operation is exceeding subtil, but seeing it is one of the most useful, it is not to be despaired. Now in those Remedies which we propounded to invest the spirits with a robust heat, or that which we call Operative, not Predatory, we have in some sort ratified this matter.

Canon XI.

The Condensing of the Spirits in their Substance is available to Long life.

The Explication.

This Canon is subordinate to the next precedent: for the Spirit condensed receiveth all those four properties of heat whereof we speak; but the ways of Condensing them are set down in the first of the Ten operations.

Canon XII.

The Spirit in great quantity hath no more to flying forth, and preyeth upon the body more, than in small quantity.

The Explication.

This Canon is clear of it self, seeing more Quantity doth regularly increase virtue. And it is to be seen in flames, that the bigger they are, the stronger they break forth, and the more speedily they consume. And therefore over-great plenty or exuberance of the spirits is altogether hurtful to Long life; neither need one with a greater store of spirits than what is sufficient for the function of life, and the office of a good Reparation.

Canon XIII.

The Spirit equally disperseth makes but as he to fly forth, and preyeth least upon the body, than unequally placed.

The Explication.

Not only abundance of spirits in respect of the whole is hurtful to the Duration of things, but also the same abundance unevenly placed is in like manner hurtful; and therefore the more the spirit is thred and interwoven by small portions, the least it preyeth: for Dissolution ever beginneth at that part where the Spirit is looser. And therefore both Exercise and Frictions console much to long life, for Agitation doth finely diffuse and commix things by small portions.

Canon XIV.

The inordinate and subsultory motion of the spirits doth more hasten to going forth, and doth prey upon the body more, than the constant and equal.

The Explication.

In inanimates this Canon holds for certain; for Inequality is the Mother of Dissolution: but in Animates (because not only the Consummation is considered, but the Repara-
The History of Life and Death.

Reparation, and Reparation proceedeth by the Appetites of things, and Appetite is sharpened by variety) it holdeth not rigorously; but it is so far forth to be received, that this variety be rather an alternation or enterchange than a conjunction, and as it were constant in incostancy.

Canon XV.

The Spirit in a Body of a solid composition is detained, though unwillingly.

The Explanation.

All things do abhor a Solution of their Continuity, but yet in proportion to their Denity or Rarity: for the more rare the bodies be, the more do they suffer themselves to be thrust into small and narrow passages; for water will go into a passage which dust will not go into, and air which water will not go into, may, flame and spirit which air will not go into. Notwithstanding of this thing there are some bounds: for the spirit is not so much transported with the desire of going forth, that it will suffer it self to be too much diffentiated, or be driven into over freight pores and passages; and therefore if the spirit be encompassed with an hard body, or else with an accumulous and tenacious, (which is not easily divided) it is plainly bound, and, as I may say, imprisoned, and layeth down the appetite of going out: wherefore we see that Metals and stones require a long time for their spirit to go forth, unless either the spirit be excited by the fire, or the groffer parts be differenced with corrodiny and strong waters. The like reason is there of tenacious bodies, such as Gems, five only, that they are melted by a more gentle heat: and therefore the jucnes of the body hard, a close and compact skin, and the like, (which are procured by the fire of the Aliment, and by Exercit, and by the coldness of the air) are good for long life, because they detain the spirit in close prison that it goeth not forth.

Canon XVI.

In Oily and Fat things the Spirit is detained willingly, though they be not tenacious.

The Explanation.

The spirit, if it be not irritated by the antipathy of the body enclosing it, nor fed by the over-much beneft of that body, nor solicited nor invited by the external body, it makes no great stir to get out: all which are wanting to Oily bodies; for they are neither so preying upon the spirits as hard bodies, nor so near as watry bodies, neither have they any good agreement with the air ambient.

Canon XVII.

The speedy flying forth of the Watry humor conserves the Oily the longer in his being.

The Explanation.

We said before that the Watry humor, as being confubstantial to the Air, fleeth forth foremost; the Oily later, as having small agreement with the Air. Now whereas these two humors are in most bodies, it comes to pass that the Watry doeth in a sort betray the Oily, for thus carrying forthindefibly carraicth this together with it. Therefore there is nothing more furthereth the conservation of bodies than a gentle drying of them, which causeth the watry humor to expire, and invoceth not the Oily; for then the Oily enjoyeth the proper nature. And this tendeth not only to the inhibiting of interstigation, (though that also followeth) but to the conservation of Greenness. Hence it is, that gentle Frictions and moderate Exercites, causing rather Perpiration than Sweating, conduceth much to long life.

Canon XVIII.

Air excluded conserveth to Long life, if other inconveniences be avoided.

The Explanation.

We said a little before, that the flying forth of the Spirit is a redoubled action, from the appetite of the Spirit and of the air, and therefore if either of these be taken out of the way, there is not a little gained. Notwithstanding divers inconveniences follow hereupon, which how they may be prevented we have shewed in the second of our Operations.

Canon XIX.

Youthful Spirits inserted into an old Body might soon turn Nature's course back again.
The History of Life and Death.

The Explanation.

The nature of the spirits is as the uppermost wheel, which turneth about the other wheels in the body of man, and therefore in the Intention of Long life, that ought to be first placed. Hereunto may be added, that there is an easier and more expedit way to alter the spirits, than to other Operations. For the Operation upon the spirits is two-fold: the one by aliment, which is the flow, and, as it were, about; the other, (and that two fold) which is sudden, and goeth directly to the spirits, namely, by Vapours, or by the Affections.

Canon XX.

Juices of the Body hard and roscid are good for Long life.

The Explanation.

The reason is plain, seeing we chewed before, that hard things, and dry or roscid are hardly digested; notwithstanding there is difference, (as we also noted in the tenth Operation) That juice somewhat hard is indeed less digestible, but then it is withal less repugnable; therefore a convenience is interlaced with an inconvenience, and for this cause no wonderful matter will be achieved by this. But roscid juice will admit both operations; therefore this would principally be endeavoured.

Canon XXI.

Whatever is of thin parts to penetrate, and yet hath no Acrimony to bite, begateth Roscid Juices.

The Explanation.

This Canon is more hard to practise than to understand. For it is manifest, whatsoever penetrateth well, but yet with a sting or tooth, (as do all sharp and four things) it leaveth behind it wherewithsoever it goeth some mark or print of dreness and clearing, so that it hardneth the juices, and chappeth the parts: contrarily, whatsoever things penetrate through their sinners merely, as it were by health, and by way of inflamation, without violence, they bedew and water in their passage. Of which sort we have recounted many in the fourth and seventh Operations.

Canon XXII.

Affimilation is best done when all Local Motion is expended.

The Explanation.

This Canon we have sufficiently explained in our Discourse upon the eighth Operation.

Canon XXIII.

Alimentation from without, at least some other way than by the Stomach, is most profitable for Long life, if it can be done.

The Explanation.

We see that all things which are done by Nutrition, ask a long time, but those which are done by embracing of the like (as it is in Infusions) require no long time. And therefore Alimentation from without would be of principal use; and so much the more, because the Faculties of Concoction decay in old age: so that if there could be some auxiliary Nutritious, by Bathings, Unions, or else by Clysters, these things in conjunction might do much, which single are less available.

Canon XXIV.

Where the Concoction is weak to thrust forth the Aliment, there the Outward parts should be strengthened to call forth the Aliment.

The Explanation.

That which is propounded in this Canon is not the same thing with the former; for it is one thing for the outward Aliment to be attrachted inward, another for the inward Aliment to be attracted outward: yet herein they concur, that they both help the weakness of the inward Concoctions, though by divers ways.

Canon XXV.

All sudden Renovation of the Body is wrought either by the Spirit, or by Malacifications.

The Explanation.

There are two things in the body, Spirits and Parts: to both these the way by Nutrition is long and about; but it is a short way to the Spirits by Vapours and by the Affections, and to the Parts by Malacifications. But this is diligently to be noted, that by no means we confound Alimentation from without with Malacification; for the intention of malacification is not to nourish the parts, but only to make them more fit to be nourished.

Canon
The History of Life and Death.

**Canon XXVI.**

Malacification is wrought by Confubstantials, by Imprinters, and by Closers up.

The Explication.

The reason is manifest, for that Confubstantials do properly supple the body, Imprinters do carry in, Closers up do retain and bridle the Perspiration, which is a motion opposite to Malacification. And therefore (as we described in the ninth operation) Malacification cannot well be done at once, but in a course or order. First, by excluding the Liquor by Thickners: for an outward and gross Inflow doth not well compact the body: that which entreteth must be subtil, and a kind of vapour. Secondly, by Intenrating by the consent of Confubstantials: for bodies upon the touch of those things which have good agreement with them, open themselves, and relax their pores. Thirdly, Imprinters are Conways, and intimate into the parts the Confubstantials, and the mixture of gentle astringents doth somewhat restrain the Perspiration. But then, in the fourth place, follows that great Affixation and Close up of the body by Emplasification, and then afterward by Invasion, until the supple be turned into Solid, as we said in the proper place.

**Canon XXVII.**

Renovation of the Parts Reparable watereth and reneweth the left Reparable also.

The Explication.

We said in the Preface to this History, that the way of Death was this; That the Parts Reparable died in the fellowship of the Parts left Reparable: so that in the Reaparation of these fame left Reparable Parts all our forces would be employed. And therefore being admonished by Aristotle's observation touching Plants, namely, That the putting forth of new roots and branches refresheth the body of the Tree in the passage; we conceive the like reason might be, if the flesh and blood in the body of man were often renewed, that thereby the bones themselves, and membranes, and other parts which in their own nature are left Reparable, partly by the cheerful passage of the juices, partly by that new cloathing of the young flesh and blood, might be watered and renewed.

**Canon XXVIII.**

Refrigeration or Cooling of the body, which passeth some other ways than by the Stomach, is useful for Long life.

The Explication.

The reason is at hand: for seeing a Refrigeration not temperate, but powerful, (especially of the Blood) is above all things necessary to Long life: this can by no means be effected from within as much as is requisite, without the destruction of the Stomach and Bowels.

**Canon XXIX.**

That Intermixing or Intangling, that as well Consumption as Reparation are the works of Heat, is the greatest obstacle to Long life.

The Explication.

Almost all great works are destroyed by the Nature of things Intermixed, whereas that which helpeth in one respect hurrieth in another: therefore men must proceed herein by a sound judgement, and a discreet practice. For our part, we have done so as far as the matter will bear, and our memory serveth us, by separating benign heats from hurtful, and the remedies which tend to both.

**Canon XXX.**

Curing of Diseases is effected by temporary Medicines; but Lengthening of Life requireth Observation of Diets.

The Explication.

Those things which come by accident, as soon as the causes are removed cease again; but the continued course of nature, like a running River, requires a continual rowing and falling against the stream: therefore we must work regularly by Diets. Now Diets are of two kinds: Set Diets, which are to be observed at certain times; and Familiar Diets, which is to be admitted into our daily repast. But the Set Diets are the more potent, that is, a course of Medicines for a time: for those things which are of so great virtue that they are able to turn Nature back again, are, for the most part, more strong, and more speedily altering, than those which may without danger be received into a continual life. Now in the Remedies set down in our Intentions you
The History of Life and Death.

The Living Spirit is instantly extinguished if it be deprived either of Motion or of Refrigeration, or of Aliment.

As the living body, which is the organ of the living spirit, and every motion thereof is performed by the spirit, so the living spirit ceases to be motioned when the living body ceases to act; and as the living body is in its essence a thing finite, it is necessary to consider how the parts thereof are united, and how they are free from each other. There are three parts of the body, and they are the brain, the lungs, and the heart. The brain is the organ of the senses, and the lungs are the organs of respiration. The heart is the organ of circulation. The brain is the organ of sensation, the lungs are the organs of respiration, and the heart is the organ of circulation. The brain, the lungs, and the heart are all necessary to the life of the body.

Flame is a Momentary Substance, Air a Fixed; the Living Spirit in Creatures is of a middle Nature.

The Explication.

This matter stands in need both of an higher Indagation and of a longer Explication than is pertinent to the present Inquisition. Mean-while we must know this, that Flame is almost every moment generated and extinguished; so that it is continued only by succussion: but Air is a fixed body, and is not dissolved; for though Air begets new Air out of watery moisture, yet notwithstanding the old Air still remains; whence cometh that Super-eration of the Air whereof we have spoken in the Title De Ventis. But Spirit is participant of both Natures, both of Flame and Air, even as the nourishments thereof are, as well Oil, which is homogenous to Flame, as Water, which is homogenous to Air; for the Spirit is not nourished either of only one, or of neither, but of both together; and though Air doth not agree well with Flame, nor Oil with Water, yet in a mixed body they agree well enough.

The Spirit hath from the Air his ease and delicate impressions and yieldings, and from the Flame his noble and potent motions and activities. In like manner the Duration of Spirit is a mixed thing, being neither so momentary as that of Flame, nor so fixed as that of Air: And so much the rather it followeth not the condition of Flame, for that Flame itself is extinguished by accident, namely, by Contraries and Enemies environing it; but Spirit is not subject to the like conditions and necessities. Now the Spirit is repaired from the lively and florid blood of the small Arteries which are inserted into the Brain; but this Reparation is done by a peculiar manner, of which we speak not now.

FINIS.