SYLVA
SYLVARUM,
OR,
A Natural History,
IN
TEN CENTURIES
Whereinto 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. As 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 Sambridge, Francis Tyton, Thomas Williams, John Marten, Thomas Vere, Randolph Taylor, Henry Broom, Edward Thomas, Thomas Passinger, Nevil Symons, Robert Clavel, William Cook, and James Magnus; 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 humbleness, to let Your Majesty know, it is Yours. It is true, if that Lord had lived, Your Majesty, ere long had been invoked to the Protection of another History, whereof, not Natures Kingdom, as in this; but these of

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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 lovyneness to represent unto Your Majesty, as one that was trusted with his Lordships Writings, even to the last. And as this Work affecteth 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 indigestible heap of Particulars, and cannot have that lustre 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 no where to depart from the Sense and clear experience, but to keep close to it, especially in the beginning. Besides, this Natural History was a Debt of his, being designed and set down for a third Part of the Instauration. I have also heard his Lordship discourse, That Men (no doubt) will think many of the Experiments contained in this Collection, to be Vulgar.
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 Wonders: and that experience likewise must be broken and grinded, and not whole, or as it growth; and for Use, his Lordship hath often in his Mouth, the two kites of Experiments, Experimenta Fructisera, 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 persuadeth 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
The Epistle is the same, that should have been prefixed to this Book, if his Lordship had lived.

To the Reader.

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.
### A Table of the Experiments

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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
HONORABLE
EDMUND BACON
BISHOP OF CHESTER, CANTERBURY, AND OTHER
POSTS, ETC.

A.D. 1684-1741.
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 choice Lady, and Eminent for Piety, Vertue, and Learning; Being exquisitely skilled, for a Woman, in the Greek, and Latine, Tongues. These being the Parents, you may easily imagine,
The Life of the Right Honorable

what the Fluë 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 Presages, 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 commorant, in the University, about 16 years of age; (as his Lordship had been pleased to impart unto myself) he first fell into the Dislike, of the Philosophy of Aristotle: Not for the Worthlessness of the Author, to whom he would ever ascribe all High Attributes; But for the Unfruitfulness, 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 passed, 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 Ambassador Lieger, into France; By whom, he was, after a while, 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 least, in his Father's affection;) But the said Purchase, being unaccomplished, at his Father's Death, there came no greater share to him, than his single Part, and Portion, of the Money, divisible among five Brethren; By which means, he lived, in some Straits, and Necessities, in his younger years. For as for that pleasant Scite, and Manor of Gombury, 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 necessary, and not as his Principal study. He wrote several Tractates, 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 Counsell Learned, extraordinary; a grace, (if I erre not) scarce known before. He seated himself for the commodity of his studies, and Practice; amongst the Honourable Society, of Greyes-Inn; Of which House, he was a Member; where he Erected, that
that Elegant Pile, or Structure, commonly known by the Name of the Lord Bacons 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 revered, 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 Counsel 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 accessies at Court; and to come frequently into the Queens Eye; who would often grace him with private and free Communication; Not onely about Matters of his Profession, or Business in Law; But also, about the arduous Affairs of Estate; From whom he received, from time to time, great Satisfaction. Nevertheless though she chearfed him much, with the Bounty of her Countenance; yet she never cheered him with the Bounty of her Hand; Having never conferred upon him, an Ordinary Place or Means of Honour or Profit, Save only one dry Reversion of the Registrs 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 Elizabeths Time; That it was like another mans Ground, buttalling upon his Houfe; 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 aversenes and Disaffection, towards him;}
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, whereina 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 Favor 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 Manners of Gorhambury; and other Lands and Possessions, neartherunto adjoyning, amounting to a third part more, he retained to his Dying Day.

Towards his Rising years; not before, he entered into a 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 e-
ever happy, and admired; as Jupiter was, in the production of Pallas. Neither did the want of Children, detract from his good wages of his Confort, during the Intermarriage, whom he prosecuted, with much Conjugal 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 severall Passages of his Works. In which time he composed 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 Naturae; or a Metaphysical piece, which is lost; Historia Ventorum; Historia Vitæ & Mortis; Historia Denæ & Ræ, 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 Lawes 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 Verse. 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 Veterum. Inquisitio de Magnete, Topica Inquisitionis, de Luce & Lumine; Both these not yet printed. Lastly, Sylva sylvatum, or the Natural History. These were the Fruits,
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 Miscellany 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 Observative, 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 induc'd 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 writen 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. My Self, have seen, at the latest, Twelve Coppies, of the Instauration; Revised, year by year, one after another; And every year altered, and amended.
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in the Frame thereof; Till, at last, it came to that Model, in which it was committed to the Prees; As many Living Creatures, do lick their young ones, till they bring them, to their strength of Limbs.

In the Composing of his Books, he did rather drive as a Masculine and clear Expression, than at any Finenels, or Affectionation of Phrases, and would often ask, if the Meaning were expressed plainly enough: as being one that accounted words to be but Subservent, or Ministerial, to Matter; and not the principal. And if his Stile werePolite, it was because he could do no otherwise. Neither was he 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 Divergions, from the Scope intended; and to derogate, from the Weight and Dignity of the Stile.

He was no Flodder 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 Sophistearum; 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 Dashing Man, as some men are; But ever a Couterener, and Fostener, of another Mans Parts. Neither was he one, that would appropriate the Speech, wholly to Himself; or delight to out-file others; But leave a Liberty, to the Co-Assessours, to take their Turns. Wherein he would draw a Man
Francis Lord Bacon.

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 contest 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 than 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 spake of his faculty of versifying.

Et quod tentabam scribere, Versus 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 compassion. And in civil business, as he was counsel to 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, suavibus:

B 2
Modis;
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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 King's 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 avouched,) 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, fought to list themselves in his Retinue. And if he were abused by any of them in their Places, It was only 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.

This
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 Oppor-
tunity and Place High enough, to have done it. He was no Healer 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
Vertues.

His Fame is greater, and sounds louder in Forraign Parts
abroad, than at home in his own Nation. Thereby verifying
that Divine Sentence, A Prophet is not without ho-
nour, Saviour in his own Country, and in his own house.
Concerning which I will give you a TALE only, out of a Let-
ter, written from Italy (The Store-house of Refined Wits)
to the late Earl of Devonshire, Then, the Lord Candish.
I will expect the New Essays of my Lord Chancellor
Bacon, as also his History, with a great deal of De-
sire, and whatsoever else he shall compole. But in
Particular of his History, I promise myself a thing per-
fect and Singular; especially in Henry the Seventh; Where
he may exercize the Talent of his Divine Understand-
ing. 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
does not decree with Days since, but rather increase. Di-
ers of his Works have been anciently, and yet lately, tran-
slated into other Tongues, both Learned and Modern,
by Forraign Pens. Several Persons of Quality, during his
Lordships Life, crossed the Seas on purpose to gain an Oppor-
tunity of seeing him, and Discouraging with him: Whereof one,
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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 Fitz, 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 contrived an intimate Acquaintance; And the Marquis did so much revere 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 Forraign 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 sharper 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: Recommend 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 anew, and that he had lost all the Time of his studying before.
Francis Lord Bacon.

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 Insight into Nature, he may (perhaps,) be to some, an Example. For his Diet; It was rather a plentiful, and liberal, Diet, as his Stomack 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 bred the more firm and substantial Juices of the Body, and least Diffippable: 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 Niter; Whereof he took in the Quantity of about three Grains, in thin warm Broth, 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 which (as he said,) did carry away frequently, the Großer 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, (whatsoever 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 Eclipse, but he was surprized, with a sudden Fit, of Fainting: And thus, though he observed not, nor took any previous Knowledge, of the Eclipse thereof, and as soon 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 Council, under two Kings:) Representing his full Portrait in the Posture of Studying; with an Inscription composed by that Accomplish Gentlemen, 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 enduing 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.

He 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 Victuals for twelve Moneths, and had good Winds from the East, though soft and weak, for Five Moneths space and more: but then the Wind came about, and fell 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 Victuals failed us, though we had made good spare of them: So that finding our selves in the midst of the greatest Wildernefs 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; 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 thither, where we saw the appearance of Land all that night; and in the dawning of the next day, we might plainly discern that it was a Land flat to our sight, and full of Bofgage, which made it shew the more dark; and after an hour and a halfs falling, we entered into a good Haven, being the Port of a fair City, not great indeed, but well built, and that gave a plesant 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 discomforted, we were advising with our selves, what we should do. During which time, there made forth to us a small Boat with about eight perrons in it, whereof one of them had in his hand a Tip-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 Scrool of Parchment (somewhat yellower then our Parchment,
and shining like the Leaves of Writing-Tables, but otherwise flat and flexible) and delivered it to our foremost man. In which Scroll were written in ancient Hebrew, and in ancient Greek, and in good Latin of the School, and in Spanish, these words, "Landyeuor, none of you, and provide to be gone from this Coast within sixteen days, except you have further time given you: Mean while, if you want Fresh-water or Vntual, or help for your Sick, or that your Ship needeth repair, write down your wants, and you shall have that which belongeth to Mercy. This Scroll was signed with a stamp of Cherubim's Wings, not spred, but hanging downwards, and by them a Cross. This being delivered, the Officer returned, and left only a Servant with us to receive our answer. Consulting hereupon amongst our selves, we were much perplexed. The denial of Landing, and halting 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 presige 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 Pitoles 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 glossy then ours; his under Apparel was green, and so was his Hat, being in the form of a Turbant, daintily made, and not so huge as the Turkish Turbants; 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 four 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 furth: 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, We 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 you will swear (all of you) by the Merits of the Savoir that ye are no Pirates, nor have shed blood, lawfully or unlawfully, within 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 Notary, made an Entry of this Aff. 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 Greediness 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 Conservator of Health of the City, that he should keep a distance. We bowed ourselves toward 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 aboard our Ship, holding in his hand a Fruit of that Country like an Orange, but of colour between Orange-Orange and Scarlet, which call a most excellent Odor: He used it (as it seemed) for a Precipitative against Infection. He gave us our Oath, By the Name of Jesus, and his Merits; and after told us, that the next day by six of the clock in the morning we should be sent to, and brought to the Strangers House, (so he called it) where we should be accommodated of things both for our whole and for our sick. So he left us; and when we offered him some Piftoles, he smiling, said, He must not be 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 same Officer that came to us at first with his Cane, and told us, "He came to conduct us to the Strangers House, and that he had prevented the hour, because we might have the whole day before us for our business: For (said he) if you will follow my advice, there shall first go with me some few of you, and see the place, and how it may be made convenient for you; and then you may lend 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 defolate 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 we went there were gathered some people on both sides, standing in a row, but in so civil a fashion, as if it had been not to wonder atus, 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 House is a fair and spacious House, built of Brick, of some what a bluer colour than our Brick, and with handsome Windows, some of Glass, some of a kind 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 having call it (as it seemed) that four of those Chambers, which were better than the rest, might receive four of the principal men of our company, and lodge them alone by themselves; and the other fifteen Chambers were to lodge us, two and two together; the Chambers were handseome and cheerful Chambers, and furnished civilly. Then he led us to a long Gallery, like a Dorture, where he shewed us all along the one side (for the other side was but Wall and Window) seventeen Cells, very neat ones, having Partitions of Cedar-wood. Which Gallery and Cells, being in all
all forty, (many more then we needed) were instituted as an Infirmary for sick persons. And he told us within, 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 fix of our people appointed to attend you for any business you may have abroad. We gave him thanks with all affection and respect, and fail, God surely is manifested in this Land. We offered him also twenty Pitslets; but he smiled, and onely said, What twice paid? and so 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 kind of Sider made of a Fruit of that Country, a wonderful pleasing and refreshing drink. Besides, there were brought in to us great store of those Scarlet Oranges for our sick, which (they said) were an assured remedy for sickness taken at Sea. There was given us also a Box of small gray or whitish Pills, which they wished our sick should take, one of the Pills every night before sleep, which (they said) would hasten their recovery. The next day, after that our trouble of carriage and removing of our Men and Goods out of our Ship, was somewhat sedled 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 Whales Belly, when we were as buried in the deep; and now we are on Land, we are but between Death and Life, for we are beyond both the Old World and the New, and whether ever we shall see Europe, God only knoweth: It is a kind of miracle hath brought us hither, and it must be little less that shall bring us hence. Therefore in regard of our deliverance past, and our danger present and to come, let us look up to God, and every man reform his own ways. Besides, we are come here amongst a Christian People, full of Piety and Humanity; let us not bring that confusion of face upon our selves, as to shew our vices or unworthiness before them. Yet there is more; for they have by commandment (though in form of cortesie) cloistered us within these Walls 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 straightways; if good, to give us further time? For these men that they have given us for attendance, may visithe have an eye upon us. Therefore for God's love, and as we love the reveal of our Souls and Bodies, let us so 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 admonition, and promised me to live soberly and civilly, and without 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, cloathed in blew as the former was, five that his Turban was white with a small Red Cross on the top; he had also a Tipper of fine Linnen. At his coming in he did bend his a little, and put his arms abroad. We of our parts hinted 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; whereupon six of us only sat, and the rest avoided the room. He said, "I am by 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 much further time as shall be convenient. Ye shall also understand, that the Strangers House is at this time rich and much beforehand, for it hath laid up Revenue these Thirty seven years; for to 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 pay one day less for that. As for any Merchandize you have brought, ye shall be well used, and have your Return, either in Merchandise, or in Gold and Silvers; for all is all one. And if you have any other request to make, hide it not, for ye shall find we will not make your countenance to fail by the answer ye shall receive. Only this I must tell you, that none of you must go above a Kann (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, admiring 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 Roofs of our Mouths, 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 confused with joy and kindnes, saying amongst our selves, That we were come into a Land of Angels, which did appear us daily, and prevent us with comforts which we sought 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 sat him down; and we being ten men of us (thereof were of the meaner sort, or else gone abroad) sat down with him: And when we were for, he began thus, 'We of this Island of Ben-Salem (for so they call it in their
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...the Language, have this. That by means of our solitary Situation, and of the Laws of Secrecy which we have for our Travellers, and our rare 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 rea-sonable 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 so, and that we conceive 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 (thesaid) 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 its divided by vast and unknown Seas, from the Land where our Saviour walked on Earth; who was the Apostle of that Nation, and how it was converted to the Faith. It appeared in his face, that he took great concernment in this our Question. He said, Ye knit my heart to you by asking this Question in the right place, for I shewed thee 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 Renfylk (a City upon the Eastern Coast of our Island) within night (the night was cloudy and calm) as it might be some mile in the Sea, a great Pillar of Light, nor 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 Light, more bright and resplendent than the Body of the Pillar: Upon which those strange and spectable the people of the City gathered together upon the Sands to wonder, and so after put themselves into a number of small Boats to go nearer to this marvellous light. 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. To fell us, that there was in one of the Boats, one of the wise Men of the Society of Salomon's 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.
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we now see before our eyes is thy Finger, and a true Miracle. And forasmuch as we learn in our Books, that thou never workst 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 untoun.

"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 loyly, and with silence, rowed towards the Pillar; but ere he came near it, the Pillar and Cross of Light brake up, and call it itself 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 or Chest of Cedar, dry, and not wet at all with Water, though it swim; and in the force 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 Higheft, and Apostle of JESUS CHRYST, 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 it was this Land faved from Infidelity (as the Remain of the old World was from Water) by an Ark, through the Apothetical and Miraculous Evangelium of S. Bartholomew. And here he paused, and a Messenger came and called him thence 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 agreeable and pleasing to us, as we forgot both dangers of 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 less desirous to know then fearful to ask, left 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 hardines to propound it: Humbly beseeching him, if he thought it not fit to be answered, that he would pardon it, though he rejected it. "We said, We well observed those his words which he formerly spake, That this happy Island where we now stood was known to few, and yet knew most of the Nations of the World; which we found to be true, considering they had the Languages of Europe, and knew much of our State and business; and yet we in Europe (notwithstanding all the remote Discoveries and Navigations of this last Age) never heard any of the least inkling or glimpse of this Island. This we found wondrous strange, for that all Nations have interknowledge one of another, either by Voyage into Foreign 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 stayed 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, not yet of any Ship of any other part of the World that had made return for them. And yet the marvelf refled 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 imported as if we thought this Land, a Land of Magicians, that sent forth Spirits of the Air into all parts to bring them news, and intelligence of other Countries. It was answered by us all, in all possible humbleness, but yet with a countenance taking knowledge, that we knew, that he spake it but mildly, "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,
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Quizzion: 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. As he said, "You remember it, in the Navigations of the World (specially for remote Voyages) was greater then it is now. Do not think with yourselves, that I know not now much as it is increas'd with you within the three thousand years, I know it well; and yet I say, greater then now. Whether it was, that the example of the Ark that savor'd 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 Phœnicians, and specially the Tyrians, had great Fleets; so had the Carthaginians their Colony, which is yet further West: Towards the East, the Shipping of Egypt and of Palestine was likewise great; China also, and the Great Atlantis (that you call America) which have now but Junkes and Canoaxes, abounded then in tall Ships. This Island (as appeareth by faithful Registers of those times) had then fifteen hundred strong Ships of great content. Of all this, there is with you, pausing memory, none; but we have a large knowledge thereof.

At that time this Land was known, and frequented by the Ships and Vessells of all the Nations before aforementioned, and (as it cometh to pass) they had many times Men of other Countries that were no Sailors, that came with them, as Persians, Chaldeans, Arabians; so as almost all Nations of might and fame retired hither, 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; so to Reggio (which is the same with Cambala) and Quinsay upon the Oriental Seas, as far as the Borders of the East Indies.

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 Descendants of Neptune planted there, and of the magnificent Temple, Palace, City, and Hill, and the manifold streams of goodly navigable Rivers, which (as I many Chains) inviv'd the fame Site and Temple, and the several degrees of ascent, whereby men did climb up to the fame, as if it had been a Scala Caeli, be all Poetical and Fabulous; yet much is true. That the said Country of Atlantis, as well that of Peru then called Cys, as that of Mexico then named Tyrambel; were mighty and proud Kingdoms in Arms, Shipping, and Riches; so mighty, as at one time (or at least with in the space of ten years) they both made two great expeditions, they of Tyrambel through the Atlantic to the Mediterranean Sea, and they of Cys 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 cometh) 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 republic 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 Cys, upon us, had better fortune.
fortune, if they had not met with enemies of greater clemency. For the
King of this Island (by name Altahan) a wise Man, and a great Warrior;
knowing well both his own strengt, 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 les than the space of One hun-
dred years the Great Atlantis was utterly loft 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
name Inundation was not deep, not past forty foot in most places from
the ground; so that although it destroyed Man and Beast generally,
yet some few wile Inhabitants of the Wood escaped: Birds also were
faved 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 Vvater;
yet that Inundation, though it were shallow, had a long continuance,
whereby they of the Vale, that were not drowned, perished for want of
food, and other things necessary. So as marvel you not at the thin Popu-
lation of America, nor at the Kinnedness 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 Wvorld, 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-
mained in their Mountains peopled the Country 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 Proliferity. And having likewise
in their Mountainous Habitations been used (in respect of the extrem
Cold of those Regions) to cloath themselves with the skins of Tigger,
Beasts, 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 at 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 WWars, or by a Natural
revolution of time) Navigation did every where greatly decay, and
especially for voyages (the rather by the ufe of Gallies, and such Vessells
as could hardly brook the Ocean) were altogether left and omitted.
So then, that part of entercoms which could be from other Nations
to fall to us, you see how it hath long since ceas'd, except it were by
some rare accident, as this of yours. But now of the cellation of that
other
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"That part of intercourse, which might be by our failing to other Nations: I must yield you some other cause: For I cannot say (if I should say truly) but our shipping for number, strength, Mariners, Pilots, and all things that appertain to Navigation, is as great as ever; and therefore why we should sit at home, I shall now give you an account by it self, and it will draw nearer to give you satisfaction to your principal Question."

"There reigned in this Island about One thousand nine hundred years ago, a King, whose whole memory of all others we must adore, not superfliously, but as a Divine Instrument, though a Mortal Man; his name was Salomon, and we esteem him as the Law-giver of our Nation. This King had a large heart insatiable for good, and was wholly bent to make his Kingdom and People happy: He therefore taking into consideration, how sufficient and substantive this Land was to maintain 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 falling 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 convenient cattle wherein this Land then was, so as it might be a thousand ways altered to the worse, but fear not any one way to the better; thought nothing wanted to his Noble and Heroical Intentions, but only (as far as Humane 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 novelties and commixture of manners. It is true, the like Law against the admission of strangers, with our 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 preserved all points of humanity, in taking order and making provision for the relief of strangers distressed, whereof you have ta'en. At which Speech (as reason was) we all rose up and bowed ourselves to him 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 so far, that is now in so many Ages, since the Prohibition, we have memory not of one Ship that ever returned, and but of thirteen persons only at several times that chose to return in our 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 it is not in China, for the Chinese fail where they are, or can, which theweth, that their Law of keeping our Strangers, is a Law of puillanimity and fear. But this restraint of ours hath one only exception, which is admirable, preserving the good which cometh 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 preemi- "nence: It was the erection and institution of an Order or Society which "we call Solomon's House, 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 beareth "the Founders name a little corrupted; as if it should be Solomon's Houle; "but the Records write it as it is spoken, so as I take it to be denomi- "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 have "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's Houle, "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 is within Six days; and therefore "he instituting that Houle 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 "name which were. But now to come to our present purpose. "When the King had forbidden to all his subject 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 these Ships, "there should be a Million of three of the Fellows or Brethren of Solomon "Houle, whose errand was only to give us knowledge of the affairs and "state of those Countreys, to which they were designed, 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 discover'd at Land, "and how they that must be put on shore for any time, colour themselves "under the names of other Nations, and to what places these Voyages have "been designed, and what places of Renown 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 Jewels, 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 affright- "ed to hear so strange things as probably told. And he perceiving, that we "were willing to say something, but had it not ready, in great courteux, "took us off, and descended 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 bad us not to stint our selves, for he would procure such time as we desired. Whereupon we all rose up and preferred our selves to skills the skirt of his Tipper; but he would not suffer us, and so took his leave. But when it came once amongt 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 Tether, and obtaining acquaintance with many of the City, not of the meanest quality, at whole 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 Country; 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 Country. One day there were two of our company bidden to a feast of the Family, as they call it; a most natural, pious and reverend custom it is, shewing that Nation to be compounded of all good-ness. This is the manner of it. It is granted to any man that shall live to be thirty persons descended of his body alive together; and all above three years old, to make this Feast, which is done at the cost of the State. The Father of the Family, whom they call the Tisfan, two days before the Feast taketh to him three of such Friends as he liketh to choose, and is alloted 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 Tisfan siteth in consultation concerning the good service 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 disheartened 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 censured. So likewise, direction is given concerning Marriages, and the courses of life which any of them should take; with divers other the like orders and advices. The Governor allitheth to the end: to put in execution by his publick Authority, the Decrees and Orders of the Tisfan, if they should be disobeyed, though that seldom needeth; such reverence and obedience they give to the order of Nature. The Tisfan doth also then evry 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 Feastday, the Taker or Tisfan cometh forth after Divine Service into a large Room where the Feast is celebrated; which Room hath an Halfpace at the upper end. Against the Wall, in the middle of the Halfpace, 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 anily somewhat whiter then ours, like the Leaf 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, broiding or binding in the Iveys, 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 Tirian 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 Traverse placed in a Loft above on the right hand of the Chair, with a Privy Door, and a carved Window of Glass, leaded with Gold and Blew, where the sitheth, but is not seen. When the Tirian 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 set, 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 Taratan, (which is as much as an Herald) and on either side of him two young Lads, whereof one carrieth a Scroll of their flaming yellow Parchment, and the other a cluster of Grapes of Gold, with a long foot or stalk: The Herald and Children are clothed with Mantles of Sea-water-green Sattin, but the Heraulds Mantle is streamed with Gold, and hath a Train. Then the Herald, with three Courtesies, 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 Table 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 Creditors, which is a Title proper only 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 course, and as of right, yet they are varied by discretion, according to the number and dignity of the Family. This Charter the Herald readeth aloud; and while it is read, the Father or Tirian standeth up, supported by two of his Sons, such as he chuseth. Then the Herald mounteth the Half pace, and delivereth the Charter into his hand, and with that there is an acclamation by all that are present in their Language, which is thus much, Happy are the People of BenSalem. Then the Herald taketh into his hand from the other Child the cluster of Grapes, which is of Gold, both the stalk and the Grapes; but the Grapes are daintily enamelled: And if the Males of the Family be the greater number, the Grapes are enamelled Purple, with a little Sun set on the top; if the Females, then they are enamelled into a greenish yellow, with a Crescent on the top. The Grapes are in number as many as there are Descendants of the Family. This Golden Cluster the Herald delivereth also to the Tirian, 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 Tirian retirith, 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 hap to be of Solomon 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 Guests that are bidden, who are served
with great and comely order: and toward the end of Dinner (which in
the greatest Feasts with them, lasteth never above an hour and a half)
there is an Hymn sung, varied according to the Invention of him that com-
poled it, (for they have excellent Poetie;) but the subject of it is (always)
the praises of Adam, and Noah, and Abraham; whereof 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 Births of all are only Blessed. Dinner being done, the Tirian retireth
again, and having withdrawn himself alone into a place, where hemaketh
some private Prayers, he cometh forth the third time to give the Blessing,
with all his Defendants, who stand about him as at the first. Then he
calleth them forth, by one and by one, by name, as he pleaseth, though
faldom the order of age be inverted. The person that is called (the Table
being before removed) kneeleth down before the Chair, and the Father lay-
eh 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 thee the word: The Blessing of the Ever
lasteth 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 then for them again, and saith, 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 six or seven days were spent, I was fallen into straight ac-
quaintance with a Merchant of that City, whose name was Jashin; he was a
Jew, and circumcised: For they have some few Strips of Jews yet remain-
ing 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 Attri-
butes, 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 Elijah of the Messiah, and many
other high Names; which though they be inferior to his Divine Majesty,
yet they are not from the Language of other Jews. And for the Country
of Benfalem, this Man would make no end of commending it, being de-
ficits, 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 Nachorah; 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
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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 for to command that excellent Institution of the Feast of the Family; and indeed we have experience, that those Families that are partakers of the blessings of that Feast do flourish and prosper ever after in an extraordinary manner. But hear me now, and I will tell you what I know. You shall understand, that there is not under the Heavens, so chaste a Nation as this of 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 Spirits of Formation, and there appeared to him a little foul ugly Ethiopic: But if he had desired to see the Spirits 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 Stews, no dissolute Houses, no Courtisans, nor any thing of that kind; nay 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 almost expelled. And therefore, there are with you ten infinite Men that marry not, but chuse rather a Libertine, and impure single life, than 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 issue, 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 safely so much of their strength, should greatly esteem Children (being of the same matter) as chaste 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 disolute places, or resort to Courtisans, are no more punished in Married men, than in Bachelors: And the degraded custom of change, and the delight in meretricious embraces, (where Sin is turned into Art) maketh Marriage a dull thing, and a kind of Impostulation or Tax. They hear you defend these things as done to avoid greater evils, as Advowories, Deflouring of Virgins, Unnatural Lust, and the like: But they say this is a preposterous Wit dom; and they call it Lais 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.
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"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
"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
"any People as theirs. And their usual saying is, That whosoever is unchaste,
"cannot reverence himself. And they say, That the reverence of a Mansself
"is next Religion, the chiefest Brule of all Vices. And when he had said
"this, the good Hero paused a little. Whereupon, I far more willing to hear
"him speak on, than to speak myself; yet thinking it decent, that upon his
"pause of Speech I should not be altogether silent, said only this, "That I
"would say to him, as the Widow of Sarepta said to Elias, That he was
"come to bring to memory our sins; and that I confess the righteousness of
"Bosalem, 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 mulct it in the Inheritors; for the Children of such
"Marriages are not admitted to inherit above a third part of their Parents
"Inheritance. I have read in a Book of one of your Men, of a Feigned
"Commonwealth, where the married couple are permitted before they
"contract to be one another naked. This they dislike, for they think it a
"scene to give a sinful after to familiar knowledge; but because of many
"hidden defects in Men and Women's Bodies, they have a more civil way;
"or they have near every Town, a couple of Pools (which they call
"Adam and Eve's 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
"bathe 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 Hero; 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 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
"this 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 Cloth, with wide Sleeves, and a Cape;
his under Garment was of excellent white Linnen down to the Foot,
girt with a Girdle of the same; and a Sibond or Tippet of the same about

his Neck; he had Gloves that were curious, and fit with Stone; and Shoes of
"Peach-coloured Velvet; his Neck was bare to the Shoulders; his Hat
"was like a Helmet or Spanish Moneta, 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-wishe, 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 Saphirset in borders
"of Gold, and the hinder-end the like of Emerals of the Peri colour.

There
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 studded upon blew. He had before him fifty attendants, young men all, in white Satten Loose Coats, up to the mid-leg, and Stockins of white Silk, and Shooes of blew Velvet, and Hats of blew Velvet, with fine Pinnones of divers colours set round like Harbans. Next before the Chariot, went two men bare-headed, in Linnen Garments down to the Foot, girt, and Shooes of blew Velvet, who carried, the one a Croffer, the other a Pastoral Staff like a Sheep-hook, neither of them of Metal, but the Croffer of Balm-wood, the Pastoral Staff of Cedar. Horsmen he had none, neither before, nor behind him. 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 Cullifions, 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 battal-array, then the People stood. The Windowslikewise were not crowded, but every one stood in them, as if they had been placed. When the show was past, the Jerry said to me, "I shall not be able to attend you as I would, in regard of some charge the City hath laid upon me for the entertaining of this great Person. Three days after the Jew came to me again, and said, "Ye are happy men, for the Father of Solomon's House taketh knowledge of your being here, and commanded me to tell you, that he will admit all your company to his presence, and have private conference with one of you that 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 your 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 Sattin 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, saithed about him. When we came in, as we were taught, we bowed low at our first entrance; and when we were come near his Chair, he stood up, holding forth his hand ungloved, and in posture of Blessing; and we every one of us stooped down and kissed the hem of his Tippet. That done, the rest departed, and I remained. Then he warned the Pages forth of the Room, and caused me to sit down beside him, and spake to me thus in the Spanish Tongue.
GOD Bles 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 whereunto our Fellows are assigned: And fourthly, The Ordnances and Rites which we observe.

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

The Preparations and Instruments, are these. We have large and deep Caves of several depths; the deepest are sunk Six hundred fathom, and some of them are digged and made under great Hills and Mountains; so that if you reckon together the depth of the Hill, and the depth of the Cave, they are (some of them) above three miles deep: For we find that the depth of an Hill, and the depth of a Cave from the Flat, is the same thing, both remote alike from the Sun and Heavens Beams, and from the open Air. These Caves we call the Lower Region, and we use them for all Coagulations, Indurations, Refrigerations, and Convergations of Bodies. We use them likewise for the Imitation of Natural Mines, and the producing also of new Artificial Metals, by Composition 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 Compotts 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, Convergation, and for the view of divers Meteors, as Winds, Rain, Snow, Hail, and some of the Fiery Meteors also. And upon them, in some places, are dwellings of Hermits, whom we visit sometimes, and instruct what to observe.

We have great Lakes; both salt and fresh, whereof we have use for the Fish and Fowl. We use them also for Burials of some Natural Bodies; for we finde 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 Vapour 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 tinted upon Vitriol, Sulphur, Steel, Brasses, 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 in Vessels or Bains: 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 make 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 Man's Body from Areation; 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 Berries are set, whereof we make divers kinds 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 fame Orchards and Gardens, Trees and Flowers to come earlier or later than their seasons, and to come up and bear more speedily than by their natural course they do. We make them also (by Art) much greater than their nature, and their Fruit greater and sweeter, and of differing taste, smell, colour and figure from their nature; and many of them we do 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 Diversions and Irvats, that thereby we may take light, what may be wrought upon the Body of Man, wherein we find many strange effects; as continuing life in them, though divers parts, which you account vital, be perished and taken forth; Rejuvinating 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 than 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 find means to make commixtures and copulations of divers kinds, which have produced many new kinds, and them not barren, as the general opinionis. We make a number of kinds of Serpents, Worms, Flies, Fishes, of Putrefaction; whereof some are advanced (in effect) to be perfect Creatures, like Beasts or Birds, and have Sexes, and do propagate. Neither do we this by chance, but we know beforehand of what matter and commixture what kind of those Creatures will arise.

"WWe
New Atlantis.

"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 recounting of our Brew-houses, Bake-houses and Kitchens, where are made divers Drinks, Breads, and Meats, rare and of special effects. Wines we have of Grapes, and Drinks of other Juice, of Fruits, of Grains and of Roots; and of mixtures with Honey, Sugar, Manna, and Fruits dried and decocted; also of the Tears or Woundings of Trees, and of the Pulp of Canes; and these Drinks are of several Ages, some to the age or half of forty years. We have Drinks also brewed with several Herbs, and Roots, and Spices, yea, with several Fleshes, and White-meats; whereby 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 intoxicate into the Body, and yet without all biting, sharpening 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 other. Breads we have of several Grains, Roots and Kernels, yea, and some of Flesh and Fift 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 to beaten, and made tender and moistened, yet without all corrupting, as a weak heat of the Stomach will turn them into good Chybus, 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 easily 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 Substanctes; but also exact Forms of Composition, whereby they incorporate almost as they were Natural Simples.

"We have also divers Mechanical Arts, which you have not, and Stuffs made by them; as Papers, Linnen, Silks, Tifflies, daintly 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 recited, 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."
New Atlantis.

"We have also furnaces of great diversities, and that keep great diversity of heats, fierce and quick, strong and constant, soft and mild; blown, quiet, dry, moist, and the like. But above all we have heats, in imitition of the Sun and Heavenly Bodies heats, that pass divers inequalities, and (as it were) Orbs, Progresseles and Returns, whereby we may produce admirable effects. Besides, we have heats of Dungs, and of Belles 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 solely by motion; and further, places for strong Insolations; 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 deceptions 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 light, 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 Vorms, 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; Crystals likewise, and Glasses of divers kindes, and amongst them some of Metals vitrified, and other Materials, besides 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 Musick likewise to you unknown, some sweeter then any you have, with Bells and Ringes that are daintie 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 set 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 toasting it; and some that give back the voice louder then it came, some shriller, and some deeper, yea, some rendring the voice differing in the Letters or articulate Sound from that they receive. We have all means to convey Sounds in Trunks and Pipes in strange lines and distances."
We have also Perfume-houses, where with we joyn also practices of Taste; we multiply Smells, which may seem stranges; we imitate Smells, making all Smells to breath out of other mixtures then those that give them. We make divers imitations of Taste likewise, so that they will deceive any Mans taste. And in this House we contain also a Confitere house, where we make all Sweet-meats, dry and moist, and divers pleasant Wines, Milks, Broths, and Salrets, far in greater variety than you have.

We have also Engin-houses, where are prepared Engines and Instruments for all sorts of motions. There we imitate and practice to make swifter motions then 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 then yours are, exceeding your greatest Cannons and Balflisks. 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 flights of Birds; we have some degrees of flying in the Air; we have Ships and Boats for going under Water, and brooking of Seas; also Swimming-girdles and Supporters. We have divers curious Clocks, and other like motions of Return, and some perpetual motions. We imitate also motions of Living Creatures by Images of Men, Beasts, Birds, Fishes, and Serpents; we have also a great number of other various motions, strane 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 feats of Jugling, false Apparitions, Impositures and Illusions, and their Fallacies. And surely, you will easily believe that we that have so many things truly Natural, which induce admiration, could in a world of particulars deceive the Senses, if we would disguise those things, and 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 affection of strangenes.

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 Countreys 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 therefore, bending themselves, looking into the experiments
of their fellows, and call about how to draw out of them things of use
and practice for mankind and knowledge, as well for Works, as for plain
demonstration of Causes, means of Natural Divinations, and the ease
and clear discovery of the Virtues and Parts of Bodies. These we call
Doctry men or Bene-lectors.

Then after divers Meetings and Consuits 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 pene-
trating 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 Inoculators.

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

We have also, as you may think, Novices and Apprentices, that
the success 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 some time to the State, and
some not.

For our Ordinances and Rites; we have two very long and fair Gal-
leries. 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-power; the Inventor of
Music; 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
call these by more certain Traditions, 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 create a Statue to the Inventor, and give him a libe-
ral 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
and Thanks to God for his marvellous Works; and Forms of Prayers, im-
ploring his aid and blessing for the Illumination of our Labors, and the
turning them into good and holy ues.

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 Divination-
s of Diseases, Plagues, Swarms of hurtful Creatures, Scarcity, Tempest,
Earth quakes, great Inundations, Comets, Temperatures 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
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 Naturæ præcipue quoad ulsum Humanos.

Prolongation of Life.
Restitution of Youth in some degree.

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

More ease and less loathsome Purgings.
Increasing of Strength and Activity.
Increasing of Ability, to suffer Torture or Pain.

The Alteration of Complexions, and Fatness, and Leanness.

The Alteration of Statures.

The Alteration 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.
New Atlantis.

Impressions of the Air, and raising of Tempests.
Great alteration, as in Induration, Emollition, &c.
Turning Crude and Watry Substances into Oyly and Unctuous Substances.
Drawing of new Foods out of Substances not now in use.
Making new Threds 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 digging 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 mislooked the cause; for he thought that all Sea-sands 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 Passeage 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 filleth: Now certain it is, that the Salter part of Water (once...
It seemeth Percolation or Transmission (which is commonly called Straining) is a good kind of Separation, not onely of thick from thin, and gros from fine, but of more subtle Natures; and varieith according to the Body, through which the Transmission is made. As if through a Woollen-bag, the liquor leaveth the faine; if through Sand, the fainthe, &c. They speake of severing Wine from Water, palling it through Ivy-wood, or through other the like porous body, but Non confar.

The Gum of Trees (which we feete to be commonly shinning 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 repelfente than Gums) are the fine Exudations of Stone.

Aristotle giveth the cause vaine? Why the Feathers of Birds are of more lively colours than the Hairs of Beasts; for no Bealt 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 manifeftly untrue; for Cattle are more in the sun than Birds, that live commonly in the Woods, or in some Covert. The true cause is that the excrementitious moisture of living Creatures, which maketh as well the Feathers in Birds as the Hair in Beasts, passeth in Birds through a finer and more delicate Strainer, than it doth in Beasts: For Feathers pass through Quills, and Hair through Skin.

The Clarifying of Liquors by Adhesion, is an inward Percolation, and is effected, when some cleaving Body is mixed and agitated with the Liquor; whereby the groffer part of the Liquor sticks to that cleaving Body; and so the finer parts are freed from the groffer. So the Apothecaries clarifie their Syrups by Whites of Eggs, beaten with the Juices which they would clarifie; 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 themselves harden, and are taken forth. So Hippocrates is clarifie by mixing with Milk, and stirrith it about, and then paasith it through a Woollen-bag, which they call Hippocrates Sleeve; and the cleaving Nature of the Milk, draweth the Powder of the Spices, and groffer parts of the Liquor to it, and in the passage they stick upon the Woollen-bag.

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

It may be Percolation doth not onely cause clearness and splendor, but sweetness of flavor; for that also followeth, as well as clearness, when the finer parts are seure from the groffer. So it is found, that the sweat of men that have much heat, and exercise much, and have clean Bodies and fine Skins, do smell sweet, as was laid 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, pressing 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 Compressio 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 dath, but in Solids (which break not) it is so subtle, as it is invisible; but nevertheless bewrayeth it self by many effects, as in this instance whereof we speak. For the Pressure of the Finger furthered by the wetting (because it sticketh so much the better unto the Lip of the Glass) after some continuance, puttest all the small parts of the Glass into work, that they strike the Water sharply; from which Percussion that sprinkling cometh.

If you strike or pierce a Solid Body that is brittle, as Glass or Sugar, it breaketh not only where the immediate force is, but breaketh all about into shivers anditters; 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 easiest 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 Preternatural Extent or Dimension, delivereth and restoreth itself to the natural: As when a blown Bladder (pressed) riseth again; or when Leather or Cloth tentured spring back. These two Motions (of which there be infinite instances) we shall handle in due place.

This Motion upon Pressure is excellently also demonstrated in Sounds: As when one chimeth upon a Bell, it 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 spake a little before in the Ninth Experiment. 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 Bell, and a long Nib, fill the Bell (in part) with Water: Take also another Glass, whereinto put Claret Wine and Water mingled. Reverse the first Glass, with the Bell upwards, stopping the Nib 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 handiomen set fake (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 withal, 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 feteth 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 therefore with Brandy 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 fixtnefs: 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 easily diffipate when you make Infusions; the Rule is, A short stay of the Body in the Liquor receiveth the Spirit, and a longer stay confoundeth it; because it draweth forth the Earthy part withal, which embalneth the fmer. And therefore it is an Error in Physicians, to refi simply upon the length of stay for increafing the vertue. But if you will have the Infufion strong, in thofe kinds of Bodies, which have fine Spirits, your way is not to give longer time, but to repeat the Infufion of the Body oftener. Take Violets, and infufe a good Pugil of them in a Quart of Vinegar, let them fay three quarters of an hour, and take them forth, and refufe the Infufion with like quantity of new Violets seven times, and it will make a Vinegar fo treafh of the Flower, as if a Twelve-month after it be brought you in a Sauce, you ftall smell it before it come at you. Note, that it ftmeleth more perfectly of the Flowers good while after, then at first.

This Rule which we have given, is of singular use for the preparations of Medicines, and other Infufions. As for example, the Leaf of Burrag hath an excellent Spirit, to repref the fuliginous vapor of Dusky Melancholy, and fo to cure Madness: But nevertheless, if the Leaf be infufed long, it yeildeth forth but a raw substance of no vertue: Therefore I fuppofe, that in the Must of Wine or Wort of Beer, while it worketh before it be Tunned, the Burrag 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 bind the Body; and the firft lay loofer, and the latter lay deeper:
deeper; So that if you intufc Rhubarb for an hour, and crush it well, it will purge better, and bind the Body less after the purging, than if it stood Twenty four hours: This is tried, but I conceive likewise, that by repeating the Infufion of Rhubarb, several times (as was said of Violets) letting each stay in but a small time, you may make it as strong a Purgging Medicine, as Stemmony. And it is not a small thing won in physick, if you can make Rhubarb, and other Medicines that are Beneficial, and Purgers, as those that are not without some malignity.

Purgings Medicines, for the most part, have their Purgative Virtue in a fine Spirit, as appeareth by that they indure 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 unpleasent taste of the Purger; which it is like you may do, by this course of infufing oft with little stay. For it is probable, that the horrible and odious taste is in the greater part.

Generally, the working by Infufions is gross and blind, except you first try the infuflng of the several parts of the Body, which of them issue more speedily, and which more slowly; and so by apportioning that time, can take and leave that quality which you desire. This to 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 Infufions, of one and the same Body, successively, in several Liquors. As for example, Take Orange-Pills, or Refomary, or Cinnamon, or what you will; and let them infufe half an hour in Water; then take them out, and infufe them again in other Water; and so the third time; and then taste and consider the first Water, the second, and the third, and you will finde them differing, not onely in strength and weakeh, but or elsewise in taste, or odor; for it may be the first Water will have more of the fent, 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 fame diversities with Infusions in Water; in that the several Odors (which are in one Flower, or other Body) issue at severall times, some earlie, some later: So we finde, that Violets, Woodbines, Strawberries, yield a pleasing fent, that cometh forth first; but soon after an ill fent quite differing from the former. Which is caused not so much by mellowing, as by the late infuflng of the grosfer Spirit.

As we may desire to extract the finest Spirits in some cafes; so we may desire also to discharge them (as hurtful) in some other. So Wine burnt, by reason of the evaporating of the finer Spirit, inflameh les, and is belt in Agues: opium leefeth some of his poisonus quality, if it be vaporized out, mingled with Spirit of Wine, or the like: Stem leefeth somewhat of his windines b. decocting; and (generally) subtile or windy Spirits are taken off by Incenfion, 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 Hemispheric: 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 Water, 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 "

Experiment Solitary, touching the Surface of Continuation in Liquids.
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called Novas Plaga. In this common Experiment, the cause of the enclosure of the Bubble is for that the Appetite to reful, 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 Glasse of Spitte that Children make of Rushes; and in Cables 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 Sulfuric Water, which, if there be Water enough to follow, will draw themselves into a small Thred, because they will discontinue; but if there be no remedy, then they cast themselves into round Drops; which is the Figure, that faveth the Body most from Discontinuance. The same reason is of the Roundness of the Bubble, as well for the Skin of Water, as for the Air within: For the Air likewise avoideeth Discontinuance; and therefore casteth it self into a round Figure. And for the stop and arrest of the Air a little while, it swerveth, that the Air of it self 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 a standing 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 showeres 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 lasted; 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 Disease of Naples) do report, That at the siege of Naples, there were certain wicked Merchants that barreled up Mans Flesh (of some that had been lately slain in Barbary) and sold it for Tunney; and that, upon that foul and high Nourishment, was the Original of that Disease. Which may well be; For that it is certain, that the Cannibals, in the W'est-Indies, eat Mans Flesh; and the W'est-Indies were full of the Pox when they were first discovered: And at this day the Morasts, persons, practised by the W'est-Indians, have some mixture of the Blood, or Fat, or Flesh of Man. And divers Witches, and Sorceresses, as well amongst the Heathen, as amongst the Christians, have fed upon Mansflesh, to aid (as it seemeth) their Imagination, with high and foul Vapors.

If seemeth that there be these ways (in likelihood) of Vension of Vapors or Air, into Water and Moisture. The first is Cold, which doth manifestly Condense; as we see in the contriving of the Air in the Weather-Glases; 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 Vension of Air into Water, holpen by the Rets, 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 Stillatories, 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 gros Air, that are already very near in Degree to Water. The third is that, which may be searched into, but dost 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 if so, That Increase is a Version of the Air. Therefore put VWater into the bottom of a Stillatory, with the Neb stopped; weigh the VWater first; hang in the Middle of the Stillatory a large Spunge; and see what quantity of VWater you can crush out of it; and what it is, more, or less, compared with the VWater 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) every thing in small quantity is more cause for Version; and Tangible Bodies have no pleasure in the confort of Air, but endeavor to subduct it into a more Dense Body: But in Entire Bodies it is checked; because, if the Air should Condense, there is nothing to succeed: Therefore it must be in 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 presse’d, and strengthened, doth not thereupon die; it is a means to produce Dwarf Creatures, and in a very strange Figure. This is certain, and noted long since, That the Prefure, or Forming of Parts of Creatures, when they are very young, doth alter the shape not a little: As the Stroaking of the Heads of Infants, between the Hands, was noted of old, to make Macrocephali; which shape of the Head, at that time, was esteemed. And the raising gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which observation well weighed, may teach a 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 its a common practice to stave the Infants, that they may grow more straight, and better shaped; and we see young Women, by wearing straight Bodies, keep themselves from being Gros and Corpulent.

O 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
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Sempervive, 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 see also, that Stumps of Trees, lying out of the Ground, will put forth Sprouts for a time. But it is a noble trial, and of very great consequence, to try whether these things, in the sprouting, do increase 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 send forth in the sprout, they leave in some other part; but if they gather weight, then it is Magna Naturae: For it sheweth, that Air may be made so to be condensed, as to be converted into a dense Body; whereas the race and period of all things, here above the Earth, is to extenuate and turn things to be more 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 Sempervive, must be made without oiling the cloth; for else, it may be, the Plant receiveoth nourishment from the Oyl.

Flame and Air do not mingle, except it be in an instant; or in the Vital Spirit 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 so, of Necessity, followeth a Dilatation: And therefore, let 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 suffocated 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 Salt-Fire) which having in it a notable crude and windy Spirit, first by the heat of the Fire suddenly dilateth it self; (and we know that simple Air, being preternaturally attenuated by heat, will make it self room, and break, and blow up that which refilfeth 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, Sulphur, and divers other inflammable matters, though they burn cruelly, and are hard to quench, yet they make no such fiery wind, as Gunpowder doth: And on the other side, we see that Quick-silver (which is a most crude and watry Body) heated, and pent in, hath the like force with Gunpowder. As for living Creatures, it is certain, their Vital Spirits are a substance compounded of an airy and flamy matter; and though Air and Flame, being free, will not well mingle; yet bound in by a Body that hath some fixing, they will. For that you may best see in those two Bodies (which are their Aliments) Water and Oyl; for they likewise will not well mingle of themselves, but in the Bodies of Plants, and
and Living Creatures, they will. It is no 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 greate flame, 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 Confusing Bodies. It appeareth also, that the form of a Pyramis in Flame, which we usually fee, is meeter by accident, and that the Air about, by quenching the sides of the Flame, crumeth it, and extenuateth it into that form; for of it self, it would be round: And therefore Smoak is in the figure of a Pyramis reverted; for the Air quencheth the Flame, and receiveth the Smoak. Note also, that the flame of the Candle, within the flame of the Spirit of Wine, is troubled, and doth not 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 Sticks held; more fine (perhaps) and rarified, than our Flame is. For they are all Globular and Determinate, they have Rotation, and they have the colour and splendor of Flame: So that Flame above, is durable and consistant, and in his natural place; but with us, it is a stranger, and momentand 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 toucht 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 check'd and pent. And therefore the Peripatetick (howsoever their opinion of an Element of Fire, above the Air, is justly exploded) in that point they acquit themselves well: For being oppoed, that if there were a sphere of Fire, that encompassed the Earth to near hand, it were imposible, but all things should be burnt up; they answer, that the pure Elemental Fire, in his own place, and not irrtate, is but of a moderate heat.
For as for the moving to a point or place (which was the opinion of the Antients) it is a mere vanity.

It is strange, how the Antients took up Experiments upon credit, and yet did build great Matters upon them. The oblation of some of the best of them, delivered confidently, is, That a Vessel filled with Athes, 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 Suppose, that that fifth part is the difference of the lying close, or open of the Athes; as we see, that Athes alone, if they be hard pressed, will lie in less room; and so the Athes with Air between, lie looser, and with Water closer. For I have not yet found certainly, that the Water it self by mixture of Athes 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. because may be, for that the Kernels draw out of the Earth Juice fit to nourish the Tree, as though that would be Trees of themselves, though there were no Root; but the Root being of greater strength, robbeth and devoureth the nourishment, when they have drawn it: as great Fishes devour little.

The operation of Purging Medicines, and the causes thereof, have been thought to be a great Secret; and so according to the florid 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 throughly maintained by experience. The first is, That whatsoever cannot be overcome and digested by the Stomack, is by the Stomack, either put up by Titus, or putt down to the Gutts; and by that Motion of Expulsion in the Stomack and Guts, other Parts of the Body (as the Orifices of the Veins, and the like) are moved to expel by Confect: For nothing is more frequent than Motion of Confect in the Body of Man. This Surcharge of the Stomack, is cauht either by the Quality of the Medicine, or by the Quantity. The Qualities are three, Extream Bitter, as in Athes, Coloquintida, &c. Least, and of horrible taste, as in Agarik, Black Hellebore, &c. And of secret Malignity, and disagree-ment towards Mans Body, many times not appearing much in the taste, as in Scammony, Addochamum, Antimony, &c. And note well, that if there be any Medicine that purgeth, 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 Entity 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 Modification of the Offices of the Parts, especially of the Medenary Nerves; 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 Mufkard 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 Modification be in an over-high degree, it is little better than the Convulsion of Taylors and it cometh to pass sometimes in Ansimony, especially if it be given to Bodies not replete with humors; for where humors abound, the humors have the parts.

The third cause is Attraction: For I do not deny, but that Purging Medicines have in them a direct force of Attraction; as Drawing-Plaisters have in Surgery: And we see Suce, or Balsam bruised, sneezing-powder, and other Powders or Liquors (which the Physicians call Erthines) put into the Nose, draw Pegman and Water from the Head; and so it is in Aplhemagastigins and Gargarism that draw the Rheume down by the Palate. And by this virtue, no doubt, some Purges draw more one humor, and some another, according to the opinion received: As Rubarb draweth Choler, Sean Melancholy, Agarack Pegman, &c. but yet (more of others) 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, that some Medicines work quicker than others; and that they draw quick, draw only the lighter, and more fluid humors; they that draw slow, work upon the more tough, and viscidous humors. And therefore, men must beware how they take Rubarb, and the like, alone, familiarly: for it taketh only the lightest part of the humor away, and leaveth the Mass of Humors more obdurate. And the like may be said of Worm-wood, which is so much magnified.

The fourth cause is Flatusity: For wind stirred, moveth to expel; and we finde that (in effect) all Purges have in them a raw Spirit or Wind, which is the principal cause of Torision in the Stomack and Belly. And therefore Purges lese (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 Crushing: As when Water is crushed out of a Spunge: So we see that taking cold moveth looofness by contraction of the Skin, and outward parts; and doth Cold likewise cause Rheums and Deflations from the Head, and some Astringent Plaister crush out putulent Matter. This kind of operation is not found in many Medicines: Mirabolanes have it, and it may be the Barks of Teaches; for this virtue requireth an Atfrition, but such an Atfrition, as is not grateful to the Body (for a pleasing Atfrition doth rather binde in the humors, than expel them:) And therefore such Atfrition is found in things of an hartht talkce.

The sixth cause is Lubrefaction and Relaxation: As we see in Medicines Emollients, such as are Milk, Honey, Mallows, Lettuce, Mercury, 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 Cold
Cold, relaxeth: As it is seen in Urine, Blood, Postage, or the like; which, if they be cold, break and dissolve. And by this kind of Relaxation, Fear loseth the Belly; because the heart retiring inwards towards the Heart, the Guts, and other parts are relaxed; in the same manner as Fear also causeth trembling in the Sinews. And of this kind of Purgers are some Medicines made of Mercury.

The seventh cause is Abstraction, which is plainly a scorning off, or vexation 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 scoureth Linnen-Cloth (speedily) from the founfles. But this Abstention must be by a Sharpness, without Abstraction; 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. Those 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 afterwards rejected by the Mesentery Veins, and so turn likewise downwards to the Guts; and of these two kindes, 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 far as the Liver, which tendeth 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 Solvente 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 is such as Rhubarb, and some others. The cause is, that Rhubarb is a Medicine, which the Stomack in a small quantity doth digest, and overcome (being not Flatus nor Loathome,) and so tendeth 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 to be of the second sort; which being in small quantity, moveth wind in the Stomack or Guts, and so expelled by Stool; but being in greater quantity, disfipateth 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.

We have spoken of Evacuating of the Body, we will now speak something of the filling of it by Restoratives in Consumptions and Emaciating Diseases. In Vegetables, there is one part that is more nourishing than another; as Grains and Roots nourish more than the Leaves, insomuch as the Order of the Foliantas 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 Livres, and other Entrails, 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 Marrow is more nourishing than Fat. And I conceive, that some decoction of Bones and Vineg, stamped and wellstrained, would be a very nourishing Broth. We finde also, that Scotch Skimke (which is a Porridge of strong nourishment) is made
made with the Knees and Sinews of Beef, but long boiled: Jelly also, which they use for a Kelterative, is chiefly made of Knuckles of Veal. The Pulp, that is within the Caraff of Crab, which they spice and butter, is more nourishing than the flesh of the Crab, or Caraff. 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 feemeth for the nourishing of aged Men, or Men in Consumptions, some such thing should be devised, as should be half Chylos, before it be put into the stomach.

Take two large Capons, perboil them upon a hot fire, by the space of an hour or more, till in effect all the Blood be done. Add in the decoction the Pill of a Sweet-Lemon, 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 into, 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 carced with some other Beer. It quenmeth thirst, and hath no whiff 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 Chylos aforeshand.

Tryal would be made of the like Brew with Potato-Roots, or Bar-Roots, or the Pith of Arischocks, which are nourishing Meats: It may be tried also, with other flesh: as Phefants, Partridge, Young Pork, Pig, Venison, especially of Young Deer, &c.

A Mortres made with the Brown of Capons, stamped, and drained, and mingled (after it is made) with like quantity, at the last, of Almond Butter, is an excellent Meat to nourish those that are weak, better than Back-Manger or Jelly: And so is the Cullice of Cocks, boiled thick with the like mixture of Almond Butter: For the Mortres or Cullice of itself, is more favor 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 throughly boil’d, and made into a Maiz-Cream like a Barley-Cream. I judge the same of Rice, made into a Cream; for Rice is in Turkey, and other Countrieys of the East, most fed upon, but it must be throughly boil’d in respect of the hardnes of it; and also, because otherwise it bindeth the Body too much.

Pistachios, so they be good and not mufly, jointed 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 scrap’d, because they are not without some tubil windnes.
But or adding and wherein judge where the rate, and handling or for they keep the Milk somewhat from turning, or crudling in the Stomack; and put in Sugar also for the same cause, and partly for the taints false: But you must drink a good draught, that it may stay less time in the Stomack, lest it cruddle: 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 A's-milk, which (it is true) turneth 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 Lenisyings. **Womens-milk** likewise is prescribed, when all fail; but I commend it not, as being a little too near the Juice of Mans Body, to be a good nourisher; except' it be in Infants, to whom it is natural.

Oyl of sweet Almonds newly drawn, with Sugar and a little Spice, spred upon Bread rolled, is an excellent nourisher; but then to keep the Oyl from fying in the Stomack, you must drink a good draught of Milde-Beer after it; and to keep it from relaxing the Stomack too much, you must put in a little Powder of Cinnamon.

**The Talks of Eggs are of themselves so well prepared by Nature for nourishment,** as (io they be Potched, or Rear boyled) they need no other preparation or mixture; yet they may be taken also raw, when they are new laid, with Malmsey or Sweet Wine. You shall do well to put in some few slices of Eringium Root, and a little Amber-grease: 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 alwaies hinder nourishment.

**Mincing of Meat, as in Pies, and Buttered minced Meat, faveth the grinding of the Teeth; and therefore (no doubt) it is more nourishing, especially in Age, or to them that have weak Teeth; but the Butter is not so proper for weak Bodies, and therefore it were good to moisten it with a little Clare Wine, Pill of Lemmon 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 Pitsachomilk, or Barley, or Maiz Cream; adding a little Corriander-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 easiuest, and plentifullest Nourishment; and now we will speake of the best Means of conveying, and conversing the Nourishment.*

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 Rofcide Juicay of the Body, and inter-common with the Spirits of the Body, and to deceive and rob them of their Nourishment. And therefore if the Consumption, growing from the weakest of the Stomack, 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 Hippocrates Rule is to be followed, who adviseth quite contrary to that which is in use: Namely, That the Linnen or Garment next the Flesh, be in Winter dry and of changed; and in Summer seldom changed, and smeared over with Oyl. For certain it is, that any substance that is fit, 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 resort to outward applications to the Stomack: Wherein it hath been tried, that the Quilts of Rofes, Spices, Maltick, Wormwood, Mint &c. are not helpful, as to take a Cake of New Bread, and to bedew it with a little Sack or Ale, 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 Affusion, inasmuch, as it hardeneth a piece of Fleth, or a Flower that is laid in it. And therefore a Bag quilted with Bran, is likewise 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 sleepe. For we see, that Bears and other Creatures that sleepe 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 let spend the nourishment in Sleep, than when living Creatures are awake: And because (that which is to the present purpose) it helpeth to threth out the nourishment into the parts. Therefore in aged men, and weak Bodies, and such as abound not with Choler, a short sleepe after dinner doth help to nourish: for in such Bodies there is no fear of an over-hasty digestion, which is the inconvenience of Post-méridian 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 fitting 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 some nourisht the Body in the pastage. And thus we see notably proved also, in that the oft cutting or pollarding of Hedges, Trees, and Herbs, doth conduct much to their lasting. 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 Inteneration 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
casie to nourish, that the other may be relieved, and (as it were) drink in
nourishment in the passage. Now we see that Draughts, &c. put into good
Pallure, recover the Fleth of young Cattel; and Men after long emaciating
Diets, wax plump and fat, and almost new: So that you may, surely conclude,
that the frequent and wife 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 upon Living Creatures like the Torment of Mercurii.

For the parts in Mans body easily repairable (as Spirits, Blood, and Fleth),
die in the embracement of the parts hardly repairable as Bones, Nerves,
and Membranes) and likewise some Entrails (which they reckon amongst
the Spermatical Parts) are hard to repair: Though that division of Sper-
matical and Membrual Parts, be but a conceit. And this same observa-
tion also may be drawn to the present purpose of nourishing emaciated Bodies:
And therefore Gentle Frication draweth forth the nourishment, by making
the parts a little hungry and heating them, whereby they call forth nourish-
ment the better. This Frication 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 ointments, that make the parts more
apt to Asimilate. 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 sleepes; 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 (my self) a Remedy for the Gout, which hath
often failed, but driven it away in Twenty four hours space: It is first to
apply a Plaster, of which, vide the Receipt, and then a Bath or Fomentation,
of which, vide the Receipt, and then a Plaister, vide the Receipt. The Plaister
relaxed the Pores, and maked the humor apt to exhalre. The Fomentation
calleth forth the humor by Vapors; but yet in regard of the way made by
the Plaister, 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 Afftrigent Plaister, which repelleth the new humor from falling.
The Plaister alone would make the part more hot and weak, and apter to take
the defluxion and impression of the humor. The Fomentation alone, if it
were too weak, without way made by the Plaister, would draw forth little:
it 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 exasper-
rate it, as well asthrive new humor; therefore they must be all taken in
order, as is said: The Plaister 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.

There
Here is a secret way of Cure, unpractised by Alchemists 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 cause: The brook-
ing of enormous quantity of Meats, and fo of Wine, or strong drink, hath
been by custom made to without Surfeit or Drunkenness. And generally
Diseases that are Chronic, as Cough, Phlegm, some kinds of Palsy, Lungen,
&c. are most dangerous at the first: Therefore a wise Physician will
consider, whether a Disease be incurable, or whether the just cure of it be
not full of peril; and if he finde it to be such, let him refer to Palliation,
and alleviate the Symptom without baffling 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 fo by
time turn suffering into Nature.

Divers Diseases, especially Chronic. (such as quartan Ague) are some-
times cured by Surfeit and Excesses; as excesses of Meat, excesses of Drink,
excessive Pasting, extraordinary Stirring, or Latitude, and the like.
The cause is, for that Diseases 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 only to their first cause: which,
if it be anything weak, will fall off. Besides, such Excesses do excite and spur
Nature, which thenupon riseth more forcibly against the Disease.

Here is in the Body of Man, a great consent in the Motion of the several
parts: We see it is Children’s sport, to prove whether they can rub upon
their Breast with one hand, and patupon their Forehead with another;
and likewise they shall sometimes rub with both hands, or pat with
both hands. We see, that when the Spirits that come to the Nostrils, ex-
pel a bad scent, the Stomack is ready to expel by vomit. We finde that in
Conjunctures of the Lungs, when Nature cannot expel by Cough, Men fall into
Fluxes of the Belly, and then they die. So in Pestilence Diseases, if they can-
ot be expelled by Sweats, they fall likewise into Leaps, and that is commonly
Mortal. Therefore Physicians should ingeniously contrive, how by Mo-
tions that are in their power, they may excite inward Motions that are not
in their power, by consent; as by the flench of Feathers, or the like, they
cure the rising of the Mother.

Hippocrates Aphorism, in Morbus Minus, is a good profound Aphorism. It im-
porteth, that Diseases contrary to the Complexion, Age, Sex, season of
the year, Diet, &c. are more dangerous than those that are concurrent. A
Man would think it should be otherwise; For that when the Accident of
Sicknes, and the Natural disposition, do second the one the other; the
Diseases should be more forcible. And (so no doubt it is, if we suppoze like
quantity of Matter. But that which maketh good the Aphorism, is, because
such Diseases do shew a greater collection of Matter, by that they are able
to overcome those Natural inclinations to the contrary. And therefore in
Diseases of that kinde, let the Physician apply himself more to Purification,
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 Purges do many times great hurt, if the Body be not accommodated, both before and after the Purging. The hurt that they do, for want of Preparation before Purging, is by the thickening of the Humors, and their not coming far away; which caueth in the Body great perturbations, and ill accidents, during the Purging; 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, Aperitifs or Preparing Broths; Clysters also help lest the Medicine stop in the Guts, and work gripingly. 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 purgeth after hard Frothy Weather, and in a lean Body, without Preparation. For the hurt that they may do after Purging, 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 Purging, to use Aperitifs and Broths, not so much opening as those used before Purging, but Abstaining 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 Repercutive 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 stanche the Bleeding of the Nose; also it hath been tried, that the Testicles being put into sharp Vinegar, hath made a sudden recession of the Spirits, and stanche Blood. Thirdly, by the Reces of the Blood by Sympathie; for it hath been tried, that the part that bleedeth, being thrust into the body of a Capon, Sheep, new ript and bleeding, hath stanched Blood; the Blood, as it escaped, being sucked up by similitude of substance, the Blood it meeteth with, and so itself going back. Fourthly, by Custom and Times: for the Prince of Aumage, in his first hurt by the Spanish Boy, could scarce no means to stanche the Blood, either by Medicine or Ligaments, but was fain to have the Orifice of the Wound stopp'd by Mens Thumbs, succeeding one another, for the space at the leaf of two days; and at the left the Blood by custom only retired. There is a fifth way also in use, to let Blood in an adverse part for a Revulsion.

It helpeth, both in Medicine and Aliment, to change and not to continue the same Medicine and Aliment still. The cause is, for that Nature by continual use of any thing, groweth to a satiety and dulness, either of Appetite or Working. And we see that Affliction of things hurtful, doth make them leeseth their force to hurt; As Poison, which with us some have brought themselves to brook. And therefore it is no marvel, though things helpful by custom, leesse their force to help, I count intermission almost the same thing with change; for that, that hath been intermitted, is after a fort new.
Century 1.

It is found by Experience, that in Diets of Guiacum, Sarsaparilla, and the like, (especially, if they be strict) the Patients is more troubled in the beginning than at continuance; which hath made some of the more delicate sort of Patients, give 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 Humors 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 discurse of caules. For Heat and Cold are Nature two hands, whereby the chief, worketh; and Heat we have in readiness, in respect of the Fire: But for Cold, we must lay 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 Vaullets 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 (Primam Frigida)) This hath been altered, as well by Ancient, as by Modern Philosophers. It was the tenet of Parmenides it was the opinion of the Author of the Discourse in Plato's, (for I take it, that Book was not Plato's own) De primo frigido. It was the opinion of Tele- fius, who hath renewed the Philoecy of Parmenides, and is the best of the Novels.

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, whatsoever will be an Enquirer into Nature, let him resort to a Conservatory of Snow and Ice; such as they use of delicacy, to cool Wine in Summer: Which is a poor and contemptible use, in respect of other uses that may be made of such Conservatories.

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 acceleratory heat by Fire, Life, or Motion: For even the Spirit of Wine, or Chymical Olis, 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 rfter Bodies. And it is certain, that Earth, Dense, Tangible, hold all of the Nature of Cold: The cause is, for that all Matters Tangible being Cold, it must needs follow, that where the Matter is most 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 Lime (which hath a quick Spirit) is Cold, more cold to the Tongue than a Stone: so Water is
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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 in the operation of Opiurn, and vaporous and fire upon the Spirits of Living Creatures; and it was 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 succed: For besides that, the virtue of Opium will hardly penetrate thorough 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 was not amiss therefore to try it with warm waters; the one exposeth 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 blaze, 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 Experiment 27. But because it is Natural 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 Sailers have used every night, to hang Fleeces of Wool on the sides of their Ships, the Wool towards the Water; and that they have cruized 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 Vessels also (as it should seem) of the Air into Water; if any of those Vessels were empty. 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-Indies if you set 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 distant 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 encroach the weight of the Wool: But it may be, that the Heat of the Wool remaining from the Body of the Sheep, or the heat gathered by the lying close of the Wool, helpeth to draw the watry vapor; but that is nothing to the Version.

It is reported also credibly, that Wool new shorn, being laid casually upon a Vessel of Vorse; after some time hath drunk up a great part of the Vorse, though the Vessel 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 Stuing of the Vorse throw the Wool; for Vorse of it self would never have pass'd through the Wood: \( \text{So, as it seemeth, it must be first in a kind of vapor before it pass.} \)

It is especially to be noted, that the cause that doth facilitate the Version of Air into Water, when the Air is not in gross, but subtilly mingled with tangible Bodies, is, (as hath been partly touched before) for that tangible Bodies have an antipathy with Air; and if they 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, Fuse-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 Wainscot doors, which is a kind of infusion; and is much like to an infusion in Water, which will make VWood to swell; as we fee in the filling of the Chops of Bowls by laying them in VWater. But for that part of these Experiments, which concerneth Attraction, we will reserve to the proper Title of Attraction.

There is also a Version of Air into Water, seing in the Sweating of Marbles, and other Stones; and of Wainscot before, and in moist weather. This must be, either by some moisture the Body 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 caused by the smoothness and clotheness, which leteth in no part of the vapor, and so turneth it back and thicketh it into Dew. We see also, that breathing upon a Glas, or smooth Body, giveth a Dew; and in Frosty mornings (such as we call Rime frosts) you shall finde drops of Dew upon the inside of Glas-windows; And the Frost itself upon the ground, is but a Version or Condensation of the moist vapors of the night, into a watry substance: Dewes likewise, and Rain, are but the returns of moist vapors condensed; the Dew, by the cold onely of the Sun's departure, which is the gentler cold; Raines, by the cold of that which they call the Middle Region of the Air, which is the more violent Cold.

It is very probable (as hath been touched) that that which will turn Water 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 speake in another place) with Air in place of Water, and the
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Indurations or Lapidification of Substances more soft, is likewise another degree of Condenfation, 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 confipate, as hath been said.

The second is by Heat, which is not proper but by consequence; for the heat doth attenuate, and by attenuation both fend 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 allow to munite themselves against the force of the Fire, which they have suffered.

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

The examples of Induration taking them promiscuously, are many: As the Generation of Stones within the Earth, which at the first are but Rude Earth or Clay; and so of Minerals, which come (no doubt) at first of Juyces Concrete, which afterward indurate: And so of Parcellane, 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 Brack-Roots, and some other matters; also the Exudations 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 Smithis 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 conciliate.

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 kind of Gravelly Stone. It is likely those Waters are of some Metalline Mixture; but there would be more particular inquiry made of them. It is certain, that an Egg was found, having lain many years in the bottom
bottom of a Moat, where the Earth had somewhat overgrown it: And this Egg was come to the hardnes of a Stone, and had the colours of the White and Yolk perfect; and the Shell shining in small Grains, like Sugar or Alabaster.

Another Experience there is of Induration by Cold, which is already found, which is, That 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 exhaling of the moister parts, doth either harden the Body; as in Bricks, Tiles, &c. Or if the Heat be more fierce, maketh the grasper part of it to 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 Indurateth, and then maketh Fragile; and lastly, It doth Incinurate and Calculate.

But if you desire to make an Induration with Toughness, and let's 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 teething 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 teething, 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 hard or fragile: But the Substance of the Water will be shut out. This Experiment we made, and it proved 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 like to Silver, and is more flexible by much. There were also put into an Earthen Bottle, placed as before, a good pellet of Clay, a piece of Cheese, a piece of Chalk, and a piece of Free-stone. The Clay came forth almost of the hardnes of Stone: The Cheese likewise very hard, and not well to be cut: The Chalk and the Free-stone much harder than they were. The colour of the Clay inclined not a whit to the colour of Brick, but rather to white, as in ordinary drying by the Sun. Nor, that all the former trials were made by a boiling upon a good hot fire, renewing the Water as it conformed, with other hot Water; but the boiling was but for Twelve hours only: And it is like, that the Experiment would have been more effectual, if the boiling had been for two or three days, as we prescribed before.

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

Moll of all, Induration by Affiliation 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 Affiliation.

The Eye of the Understanding, is like the Eye of the Sense: For as you may see great objects through small Crannies, or Levels; so you may see great Axioms of Nature, through small and contemptible instances. The speedy deprecation of Air upon watry moisture, and evaporation 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 mistlinest scattereth and breaketh up suddenly. But the like Cloud, if it were oily or fatty, will now discharge; not because it sticketh faster, but because Air preeyth upon Water, and Flame, and Fire, upon Oyl; and therefore, to take out a spot 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 meddleth 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 condueth to preservation of the present form, and the subsisting 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 imbibed 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 answer the trial in small, and so deceiveth many; for that (I say) the greater Body resisteth 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 fineness 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 kind of Natural Magick. For it is not a description 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 ointment, that is not hurtful to the flesh, and that will harden and flick very close, and see whether it will not alter the colours of the Feathers, or Hair. It is receiveth, 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 beHarve, 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 groller.

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 only 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 fevered from the body of the Hen, it hath no more nourishment from the Hen, but only a quickening heat when the fitteth. But Beasts and Men need not the matter of nourishment within themselves, because they are shaped within the Womb of the Female, and are nourished continually from her body.

It is inveterate and received opinion, That Campharides applied to any part of the Body, touch the Bladder, and exucerate it, if they stay on long. It is likewise received, that a kind of Stone, which they bring out of the West-Indies, hath a peculiar force to move Gravel, and to dissolve the Stone; in much, as laid but to the Wrest, 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 wetly, to those that use it not, affecteth 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 Camomil within his Socks. Likewise, Pigeon bleeding, applied to the Soals of the Feet, ease the Head; and Soluporous Medicines applied unto them, provoke sleep.

It seemeth, that as the Feet have a sympathy with the Head; so the Wrests and Hands have a sympathy with the Heart. We see the affects and Passions of the Heart, and Spirits, are notably discerned by the Pulse: And it is often tried, that Juices of Stock-gilly-flowers, Rose-campion, Carlick, and other things, applied to the Wrests, 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 Crystal.

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 fineness of the Body itself, or the fineness of the Parts, or of the lubility of the Motion.
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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 Venues 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 Prospects 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 Integument: And they be no less differing one from the other, then the Dence 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 Arefsation, Colliquation, Conception, Maturation, Puresfation, Evaporation, and most of the effects of Nature. For, as we have figured them in our Sapiens Diderum, in the Table of Proserpina, you shall in the Infrnal Regiment hear little doings of Pluto, but most of Proserpina: For Tangible Parts in Bodies, are stupid things, and the Spirits do (in effect) all. As for the differences of Tangible Parts in Bodies, the industry of the Chymists hath given some light in discerning by their separations, the Oily, Crude, Pure, Impure, Fire, 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 stupefying part, and a heating part; the one moving Sleep, the other a Sweat following; and that Rubarb hath Purging parts, and Affringing parts, &c. But this whole Inquisition is weakly and negligently handled. And for the more trivial 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 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. Atomus (faith he) necessitate Rationum & Experimenta effe convincitur: Atomum enim nemo nuncquam vidit. And therefore the tumult in the parts of solid Bodies, when they are comprized, 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 muchles to produce, a number of Mechanical Motions. Again, as to the Motions Corporal, within the Enclosures of Bodies, whereby the effects (which were mentioned before) pass between the Spirits and the Tangible parts (which are Arefation, Colliquation, Conception, Maturation, &c.) they are not at all handled; but they are put off by the names of Venues, and Nature, and Actions, and Passions, and such other Logical words.
It is certain, that of all Powers in Nature, Heat is the chief; both in the Frame of Nature, and in the Works of Art. Certain it is likewise, that the effects of Heat, are most advanced, when it worketh upon a Body without loss or dissipation of the matter, for that ever 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 Reciprocalion of Rarefaction, and of Condensation, and of Separation, admitted; then it is like that this Process of Matter, being held by the Sleeve, 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 kept quick kindled, for some few hours space; then take the Vessel from the Fire, and take off the Cover, and see what is become of the Wood, I conceive, that since all Inflammation and Evaporation are utterly prohibited, and the Body still turn'd 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 Ambra gena, (as the Chemists call it,) or, that the fiercer part will be turned into Air, and the grostarick as it were baked, and incrustate upon the sides of the Vessel, being become of a denser matter, than the Wood it self, crude. And for another tryst, take also Water, and put it in the like Vessel, stop'd 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 pult, that the Water which is one of the simplest of Bodies, be 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 an 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) which is like the Wombs and Matrices of Living Creatures, where nothing expireth nor is produced: We will speak fully, in the due place. Not that we aim at the making of Porcellus Pigments, or any such prodigious follicles; 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 Transformations of Bodies, as to endeavor and urge by all means, the reducing of them to Nothing. And herein is contained al-
to 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 Heterogeneal, 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 crassitude, they will alter in their own Body, though they spend not. But of this, we shall speak more when we handle the Title of Conservation of Bodies.
Ulrick in the Practice, hath been well pursued, and in good Variety; but in the Theory, and especially in the yielding of the Causes 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 Unmusical 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 hills; 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 Nightingale Pipes of Regals, or Organs, and other Hydraulicks, which the Ancients had: and Nero did so much esteem, but are now lost. And if any Man think, that the String of the Bow, and the String of the 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
create Tones; Percussion of Metals (comprehending Glass, and the like) Percussions of Air, and Percussions of Water.

The Diapason or Eight in Musick, is the sweetest Concord; inasmuch, as it is in effect an Binion; as we see in Lutes that are strung in the base strings with two strings, one an Eighth above another, which make but as one found; and every Eighth Note in Accent, (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) admitted 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 Articulate 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 less.

Yet this is true, That in the ordinary Rifes 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 Tunion 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 flops of a Lute, or by whole Notes alone, without Halves as far as an Eighth; he will not be able to frame his Voice unto it, which heareth, that after every three whole Notes, Nature requirèth, for all Harmonical Life, one Half-Note to be interpersed.

It is to be considered, That whatsoever vertue is in Numbers, for conducing to concet 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 Semiperfect, between the Tunion and the Diapason, are the Fifth, which is the most Perfect; the Third next, and the Sixth which is more harsh: And as the Ancients esteemed, and do my self, and some other yet, the Fourth which they call Diapasons; 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.
For Discords, the Second and the Seventh, are of all others, the most odious in Harmony to the Sense; whereas, the one is next above the Vison, the other next under the Diapason; which may shew, that Harmony requires a competent distance of Notes.

In Harmony, if there be not a Discord to the Base, it doth not disturb the Harmony, though there be a Discord to the higher parts; so the Discord be not of the Two that are odious. And therefore the ordinary Concert of Four parts consisteth of an Eighth, a Fifth, and a Third to the Base; but that Fifth is a Fourth to the Treble, and the Third is a Sixth. And the cause is, for that the Base striking more Art, doth overcome and drown the Treble (unless the Discord be very odious) and so hideth a small imperfection. For we see, that in one of the lower strings of a Lute, there foundeth not the sound of the Treble, but 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 interpret sometimes. Nevertheless, we have some Slides or Relishes of the Voice or Strings, as it were, continued without Notes, from one Tone to another, rising or falling, which are delightful.

The causes of that which is Pleasing or ingrane to the Hearing, may receive light by that which is Pleasing or ingrane to the Sight. There be two things pleasing to the light (leaving Pictures and Shapes aside, which are but Secondary Objects, and pleasa or displeasa but in Memory;) these two are Colours and Order. The pleasing of Colour symbolizeth with the playing of any Single Tone to the Ear; but the pleasing of Order doth symbolize with Harmony. And therefore we see in Garden-knot, and the Frets of Houses, and all equal and well answering Figures, (as Globes, Pyramids, Cones, Cylinders, &c.) how they please; whereas unequal Figures are but Deformities. And both these pleasures, that of the 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 causes of Harmony. But to find the Proportions of that Correspondence, is more abstruse; whereas, 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 cause whereof is, for that Tones, because they are equal and slide not, do more strike and erect the Sense, than the other. And overmuch attention hindereth sleep.

There be in Music certain Figures or Tropes, almost agreeing with the Figures of Rhetoric; and with the Affections of the Mind, and other Senes. First, The Division and Quatering, 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 agreeeth also, with the tale, which is soon gladdened with that which is sweet alone. The Fluid from the Close or Cadence, hath an agreement with the Figure in Rhetoric, which they call Prayer Explication; 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 Triplet's and Changing of times, have an agreement with
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 Senses, 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 Spirits, and is forcible while the object remaineth) it is with a communication of the Breath or Vapor of the object odorate: 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 object 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, Doeleful Tunes, Solemn Tunes; Tunes inclining Mens minides to Pity, Warlike Tunes, &c. So as it is no marvel, if they alter the Spirits, considering that Tunes have a predisposition to the Motion of the Spirits in themselves. But yet it hath been noted, that though this variety of Tunes, doth dispose the Spirits to variety of Passions, conform unto them: yet generally, Musick feedeth that disposition of the Spirits 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.

Percusive hath been with some diligence inquired; and so hath the Nature of Sounds, in some sort, as far as concerneth Musick, but the Nature of Sounds in general, hath been superficially observed. It is one of the subtlest pieces of Nature. And besides, I prattle, as I do advise: Which is after long inquiry of things, immerse 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 rapid motion, without noise to us perceived, though in some dreams they have been said 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 greatness of distance from us, whereby the sound cannot be heard; we see that Lightnings and Corufcations, which are near at hand, yield no sound neither; and yet in all these, there is a percussion and division of the Air. The Winds in the Upper Region (which move the Clouds above (which we call the Racks) and are not perceived below) pass without noise. The lower Winds in a Plain, except they be strong, make no noise; but amongst trees, the noise of such Winds will be perceived. And the Winds (generally) when they make a noise, do ever make it unequally, rising and falling; and sometimes (when they are vehement) trembling at the height of their blast. Rain or Hail falling, though vehement, yieldeth no noise, in passing through the Air, till it fall upon the Ground. Water, Housies, or the like. Water in a River (though a swift stream, is not heard in the Channel, but
but rumeth in silence, it is 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 striated, (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 turned forwards by another Body contiguous, without knocking giveth no noise. And so Bodes, in weighing, one upon another, though the upper Body presses 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) paletteth without sound: For that sound, thists heard sometimes, is produced only by the breaking of the Air, and not by the impulse 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 be sharply percussed; as in the sound of a string, where Air is percussed by a hard and stiff Body, and with a sharp noise: For if the string be not strained, it maketh no noise; but where the Air is pent and strained, there breath or other blowing (which carry but a gentle percussion) suffice to create sound; as in Pipes and Wind Instruments. But then you must note, that in Recorders which go with a gentle breath, the Concate of the Pipe (were it not for the Fipple that striatineth the Air much more then the simple Concate) would yield no sound. For, as for other Wind-Instruments, they require a forcible breath, as Trumpets, Conaches, Handcorns, Horns, &c. Which appeareth by the blown Checks, so him that windeth them. Organ also are blown with a strong wind by the Bellows. And note again, that some kind of Wind-Instruments are blown at a small hole in the side, which striatineth 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 Whistling, you contract the mouth; and to make it more sharp, Men sometimes use their finger.

But in open Air, if you throw a Stone or a Dart, they give no sound: No more do Bullets, except they happen to be alittle hollowed in the casting; which hollowness penneth the Air: Nor yet Arrows, except they be ruffled in their Feathers, which likewise penneth the Air. As for small Whistle 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 percuss’d, give no sound; as when a Man treadeth very softly upon Boards. So Ghosts or Doors in fair weather, when they open easily, 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 paletteth without sound. Air in Ovens, though (no doubt) it doth (as it were) boil, and dilate it self, and is repercuss’d, ye 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 it self. And 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, giveth a bellowing sound.
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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 if it seemeth to me impossible; for if the Air pent, be driven forth and strike the Air open, it will certainly make a noise. As for the White Powder, (it is 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 commeth to the Mouth of the Pece, 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, thorow the Barrel of a Pece, it may-be it would give several sounds, both at the Noe 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 Pece, the Bullet might flie with small or no noise. For if it is certain, there is no noise in the Percussion of the Flame upon the Bullet. Next the Bullet, in piercing thorow the Air, maketh no noise, as hath been said; and then, if there be no pent Air, that striketh upon open Air, there is no cause of noise, and yet the flying of the Bullet will not be staid. 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 Air, no more than you mean to fill with Powder, and laying the Bullet in the Mouth of it halt 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 hindred) 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 a great strength, (as they talk generally of Burning-Glasses, that are able to burn a Navy) the Percussion of the Air alone, by such a Burning-Glass, would make no noise; no more than is found in Corruptions, and Lighnings without Thunder.

I suppose that Impression of the Air with Sounds, asketh a timeto be conveighed 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 swiftnes 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 flight, give an entity of sound, which we call Crackling, Puffing, Spitting, &c. As in Bay-fair, and Bay-leaves cast into the fire; so in cheznuts, when they leap forth of the Ashes, so in green wood laid upon the fire, especially Roots; so in Candles that spit flame, if they be wet; so in Ralping, Sneezing, &c. Soain a Rofe leaf gathered together into the fasion of a Purfle, 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 anything, 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 be false, in that the Sound of a Bell-string, or the like, continued melting, sometimes after the Percussion; but ceaseth straight-ways, if the Bell or String be touched and stay'd; 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 so suddenly that motion, caused by the Elision of the Air. This appeared yet more manifestly, 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 Echo's (whereof some are as loud as the Original Voice) there is no new Elision, but a Repercussion only. But that, which convinces it most of all, is, That Sounds are generated, where there is no Air at all. But these, and the like conceits, when Men have cleared their Understanding, by the light of Experience, will scatter and break up like a Mift.

It is certain, that Sounds is not produced at the first, 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 meer yielding or cession, 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 conveigh'd in the Air. For as to the former, we see manifestly, that no Sound is produced (no not by Air it self against other Air, as in Organs, &c.) but with a perceptible Blast of the Air, and with some resistance of the Air strucken. For, even all Speech, (which is one of the gentlest Motions of Air,) is with expulsion of a little Breath. And all Pipes have a blast, as well as a Sound. We see also manifestly, that Sounds are carried with Wind: And therefore Sounds will be heard further with the Wind, than against the Wind; and likewise, do rise and fall with the intention or remission 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 first. Neither doth the Wind (as far as it carrieth a Voice) with the Motion thereof, confound any of the delicate, and Articulate Figures of the Air, in variety of Words. And if a Man speak a good loudness against the flame of a Candle, it will not make it tremble much; though most, when those Letters are pronounced, which contract the mouth, as F, S, V, and some others. But gentle breathing, or blowing without speaking, will move the Candle 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 first: So it paralleleth in so many other things with the light, 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 fray'd with the
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the Motion, caused by noise upon the Water. But these 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 extream applause, and shouting of people, assembled in great multitudes, have so raffled, and broken the Air, that Birds flying over, have fallen down, the Air being not able to support them. And it is believed by some, that great Ringing of Bells in populous Cities, hath chased away Thunder; and also dissipated pestilent Air: All which may be allo from the concussion of the Air, and not from the Sound.

A very great sound near hand, hath stricken many deaf; and at the instant they have found, as it were, the breaking of a Skin of Parchment in their Ear: And my self, standing near one that lur'd loud and shrill, had suddenly an offence, as if somewhat had broken, or been disconnected in my Ear, and immediately after a loud Ringing; (not an ordinary Singing, or Hissing, but far louder, and differing; so I feared some Deaftness. 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 doth destroy the Sense; and Spiritual Species, (both Visible and Audible,) will work upon the Senfories, though they move not any other Body.

In Diflation of Sounds, the enclofure of them preferveth them, and caufeth 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 caufe is, for that the Sound spendeth, and is dissipated in the open Air; but in such Concaves, it is confined 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 paffeth, 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 enclof'd, all the length of his way, but paffeth partly through open Air; as where you speak some distance from a Trunk, or where the Ear is some distance from the Trunk, at the other end; or where both Mouth and Ear are distant from the Trunk. And it is tried, that in a long Trunk of some Eight or ten foot, the Sound is holpen, though both the Mouth, and the Ear be a handfull or more, from the ends of the Trunk; 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 Enclofure, that is round about and entire, preferveth the Sound; so doth a Semi-concave, though in a lefs degree. And therefore, if you divide a Trunk, 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 Maft 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 Retort'd; or in some Pipe that were Sinuous.
It is certain, (howsoever it crosses 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 an 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 belide the main point of creating found without Air, you may collect two things; the one, that the found communicateth with the bottom of the Vessel; the other, that such a communication paffeth 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 insinde; 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 paffeth to the insinde; and a number of other like instances, whereof we shall speak more when we handle the Communication of Sounds.

It were extrem grohetts to think (as we have partly touched before) that the found 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 resin. palleages to the Creation of the found, the found 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 reflux of the String, which was strained by the touch to his former place: which Motion of Reflux is quick and sharp, whereas the first Motion is soft and dull. So the Bow tortureth the String continually, and thereby holdeth it in a 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 spreadeth itself. But if the sound, which would scatter in open Air, be made to go all into a Candle; 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 Hunters Horn, being greater at one end, than at the other, doth encrease the found more, than if the Horn were all of an equal bore. The cause is, for that 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 bunter. And even Hunters Horns, which are sometimes made
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 slitting into a straight concave again.

There is in S. James's Fields, a Conduit of Brick, unto which joyneth a low Vault; and at the end of that, a round House of Stone; and in the Brick Conduit there is a Window, and in the round House a Slit or 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.

\textit{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 Trunk: Namely, for that the Sound, enclosed with the sides of the Bell, cometh forth at the holes unspent and more strong.

In Drums, the clopenss round about, that preferveth 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 penetreth 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 \textit{Reflections of Sounds}; the one at Distance, which is the Echo, wherein the original is heard distinctly, and the Reflection also distinctly; of which, we shall speak hereafter. The other in Concurrency; when the Sound reflecting (the Reflection 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 \textit{Lute}, or \textit{Viol}, or \textit{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 Flat of a Board, without that Hollow and Knot, to let in the upper Air into the lower. The cause is, the Communication of the upper Air with the lower, and penning of both from expense or dispersing.

An \textit{Irish Harp} hath open Air on both sides of the Strings; and it hath the Concave or Belly, not a long the Strings, but at the end of the Strings. It maketh a more resounding Sound, than a \textit{Bandora, Orpharion, or Cattern}, 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 \textit{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 pen 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 preserved somewhat by the plain Wall; but that is too weak to give a Sound audible, till it hath communicated with the back Air.

Strike upon a Bow-string, and lay the Horn of the Bow near your Ear, and it will increase the Sound, and make a degree of a Tone. The cause is for that the senility, by reason of the close holding is percussed, before the Air disperseth. The like is, if you hold the Horn betwixt your Teeth. But that is a plain Dilation 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 Tuneteteth the Teeth once edge. The like fallcthout, if the Horn of the Bow be put upon the Temples; but that is but the glide 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 communicateth 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 ones arm, in the midst of the Chamber, which, if you had struck, it would make a little flatnoise 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 Dilation, 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 weakness or exility. If therefore you stop the Holes of a Hawk's Bell, it will make no ring, but a flat noife or rattle. And if doth the Elettes or Eagles Stone, which hath a little stone within it.

And as for Water, it is a certain Tryal: Let a man go 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 pretend it down under the Water some handful and an half, still keeping it even, that it may not tire on either side, and so the Air get out: Then let him that is in the Bath, dive
with his head so far under Water, as he may put his head into the Pail, and there will come as much Air 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 external 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 handily done, if the Pail be put over the Mans head above Water, and then he cowre down, and the Pail be prefled 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 faith, that Hercules's Page Hylas went with a Water-pot, to fill it at a pleasant Fountain that was near the shore, and that the Nymphs of the Fountain fell in love with the Boy, and pulled him under 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 lop a string high, whereby it hath leis 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 groweth more flat, even while part of the Sawcer is above the Water; but that flatness of Sound is joyned with a harshness of Sound, which, no doubt, is caused by the inequality of the Sound, which cometh from the part of the Sawcer under the Water, and from the part above. But when the Sawcer is wholly under the Water, the sound becometh more clear, but far more low, and as if the sound came from a far off.

A soft body dampeth the sound, much more than a hard; and if a Bell hath cloth of filk 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 manners. The bottom of it was set against the Palm of the Hand, stopped with Wax round about, let 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 Woolen Carpet, a Lining of Plufh, a Lock of Wool. (though loofly 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 les refounding. So likewise warm Water, when it faileth makest 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 Fipples at each end one; the Trunck of it of the length of two Recorders, and the holes answerable towards each end, and let two play the same Lection upon it, at an Unison; and let it be noted, whether the sound be confounded, or amplifid, or dulled. So likewise let a Crofs 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 stricken, 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 moveable.

The Loudness and Softness of Sounds, is a thing distinct from the Magnitude and Exaltity 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 stricketh more Air; and the Treble less 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; if against Wood, a greater; if against a Metal, yet a greater; and in Metals, if you strike against Gold, (which is the more pliant) it giveth the flatter sound; if against Silver or Brass, the more ringing sound. As for Air, where it is strongly pent, it matcheth a hard Body. And therefore we see in discharging of a piece, what a great noise it maketh. We see also, that the Charge with Bullet, or with Paper wet, and hard slopped; 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 gave. 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 current the Air speedily, whereas the of striking, doth rather beat than cut.

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

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 middil, and then upon the lower, you shall finde the sound to be more Treble, and more Base, according unto the Concave on the inside, though the Percussion be onely on the outside.

When the Sound is created between the Blas 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 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. 1 ide Experimcntum, 134.

We have spoken before (in the Inquisition touching Assize of Musical Sounds, whereunto there may be a Concord or Discord in two Parts; which Sounds we call Tones, and like wise of Imr Musical 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 speak 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 Rift 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 ungrate, because they are meerly unequal; but if they be unequal in equality, then the Sound is Grateful, but Purling.

All Instruments 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 itself or Pipe, moistened a little in the inside, foundeth more solemnly, and with a little Purling or Hisling. Again, a Wreathed String, such as are in the Basse Strings of Bandoraes, giveth also a Purling Sound.

Luta Lute-string, if it be meerly unequal in his parts, giveth a harsh and untuneable Sound, which strings we call faltys, being bigger in one place, than in another; and therefore Wire-strings are never faltys. We see also, that when we try a falt y 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 more, it is falt.

Waters, in the noife they make as they run, represent to the Ear a trembling noife; and in Regals (where they have a Pipe, they call the Nippingae-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 noife; which Trembling of Water, hath an affinity with the Letter L. All which Inequalities of Trepidation, are rather pleasan t, than otherwise.

All Basse Notes, or very Treble Notes, give an Asper Sound; for that the Basse striketh more Air, than it can well strike equally; and the Treble cutteth the Air so sharp, as it returneth too swift, to make the Sound equal; and therefore a Mean or 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 Aspera Arteria), which
which being well extended, gathered equality; as a Bladder that is
wrinkled, if it be extended, becometh 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
throating out, or drawing in of the Chin, when singing.

The Humming of Bells 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 fly.

All Metals quenched in Water, gives a vibration 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, giveth a hissing sound; but boiling in a
full Vessel, giveth a bubbling sound, drawing somewhat near to the Cocks
used 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 between each; and then the outermost
Bell were chimed with a Hammer, how the Sound would differ from a
simple Bell. Likewise take a Plate of Bras, and a Plank of Wood, and
join 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 bolder Sound; and the less quantity, the more treble Sound. The
Percussion of the greater quantity of Air, is produced by the greatness of
the Body percussing; by the Latitude of the Concave, by which the Sound
paulet; and by the Longitude of the same Concave. Therefore we see, that
a Bafe-thing is greater than a Treble; a Bafe-pipe hath a greater bore than
a Treble: And in Pipes, and the like, the lower the Note holes be, and the
further off from the Mouth of the Pipe, the more Bafe sound they yield;
and nearer the Mouth, the more Treble. Nay more, if you strike an
entire Body, as an Andiron of Bras, at the top it maketh a more Treble
found, and at the bottom a Bafet.

It is also evident, that the sharper or quicker Percussion of Air, causeth
the more Treble found; and the bolder or heavier, the more Bafe found.
Sowe 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 slackier
they are, or less wound up, the Bafet is the found. And therefore a bigger
String more strained, and a lesser String less strained, may fall into the same
Tone.

Children, Women, Enanses, 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 irregate
the
the Parts, is drawn down to the Spermatical Vessels, it leaveth the Body more hot than it was; whence cometh the dilatation of the Pipes: For we see plainly all effects of Heat do then come on; as Pilosity, more roughness of the skin, hardness of the flesh, &c.

The industry of the Philosopher, hath produced two other means of Straining, or Intension of Strings, besides their Winding up. The one is the Stopping of the String with the Finger; as in the Necks of Lutes, Viols, &c. The other is the Shortness of the Strings; as in Harps, Virginals, &c. Both these have one and the same reason, for they cause the String to give a quicker start.

In the straining of a String, the further it is strained, the less superfine strain goeth to a Note: For it requireth good winding of a String, before it will make any Note at all. And in the stops of Lutes, &c. the higher they go, the less distance is between the Frets.

If you fill a Drinking Glass with Water, (especially one sharp below, and wide above) and fill it upon the Brim, or outside; and after, empty part of the Water, and so more and more, and still try the Tone by filling; you shall finde the Tone fall; and be more Bafe as the Glass is more empty.

The just and measured Proportion of the Air percuss'd, towards the Basses or Treblets of Tones, is one of the greatest secrets in the Contemplation of Sounds. For it discovereth the true Coincidence of Tones into Diapasons, which is the return of the same Sound. And so of the Concerts and Discords, between the Unison and Diapason; which we have touched before in the Experiments of Music, but think 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 likewise of the Sound towards the String, as it is more or less strained. But note that to measure this, the way will be to take the length in a right line of the String, upon any Winding about of the Peg.

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 Botes 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 still in these last instances you must diligently observe, what length of String, or distance of Stop, or concave of Air, maketh what note of Sound. As in the last of these (which, as we said, is that which giveth the most effect demonstration) you must set down what increase 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,
unlikely; that those that make Recorders, &c. know this already; for
that they make them in Sets. And likewise Bell-Founders in fitting the
tune of their Bells: So that enquiry may 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 creat-
ing 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 upper-
most 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 Base, 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 Elysian or Selion of the same; so as the Percussion of the
one towards the other, differeth as a Blow differeth from a Gur.

In Speech of Man, the Whispering, (which they call Susurrus in La-
tin,) whether it be louder or softer, is an Interior Sound; but the Speak-
ing 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 Blow-
ing by the Mouth, Bellows, or Wind (though loud) is an Interior Sound;
but the blowing through a Pipe, or Concave (though soft) is an Exterior.
So likewise, the greatest Winds, if they have no conformation, or blow not
hollow, give any Interior Sound; the whistling or hollow Wind, yieldeth
a sining, or Exterior Sound; the former being pent by some other
Body, the latter being pent in by his own Density: And therefore we see,
That when the Wind bloweth hollow, it is a sign of Rain; the flame, as it
moweth 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 Percipient, 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 Arti-
culate
Natural History;

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.

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 faith. And one Articulate sound will confound another, as when many speak at once.

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

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 dilivering; and although (as was formerly said) a Sound Articulate, already created, will be contracted into a small craney; yet the first Articulation requireth more dimension.

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 confused, though the gros of the Sound be greater.

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 frutil and long to describe, we will refer them over, and place them amongst the Experiments of Speech. The Hebrews have been diligent in it, and have affigned which Letters are Labial, which Dental, which Converial, &c. As for the Latins and Greeks, they have distinguished between Semi-vowels and Mutes; and in others, between Mute Timnes, Modia and Affiliates, not amifs, 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 expressed, but with the contracting, or shutting of the Mouth; that the Letters N. and B. cannot be pronounced, but that the Letter N. will turn into M. as Hecatomba will be Hecatomba. That M. and T. cannot be pronounced together, but P. will come between; as Emirus, 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.

The Lungs are the most spongy part of the Body, and therefore ablest to contract and dilate it self; and where it contracteth it self, it expelleth the Air, which 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 Animate Bodies, that have no Voice Articulate, and divers Letters of Articulate Voices; and commonly Men have given such names to those Sounds as do allude unto the Articulate Letters. As Trembling of Water hath resemblance with the Letter L. Quenching of Hot Metals with the Letter Z. Snarling of Dogs with the Letter R. The Noise of Scratch-Owls with the Letters Sh. Voice of Caws with the Diphthong Eu. Voice of Chucko's with the Diphthong Ou. 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.
II. Sounds (whatsoever) move round, that is to say, On all sides, Upwards, Downwards, Forwards, and Backwards: This appeareth in all Instances. Sounds do not require to be conveyed to the Sense in a right Line, as Vehicles 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 throrow the Wall, but arched over the Wall.

If the Sound be stopp'd and repercuss'd, it cometh about on the other side, in an oblique Line: So, if in a Coach, one side of the Boot be down, and the other up; and a Begger beg on the clofe 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 hathis in the Chamber, will think the sound came from the South.

Sounds, though they spred round, so that (there is an orb, or spherical Area of the Sound) yet they move strongest, and go furthest in the ForeLines, 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 Harp, or Organ 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. Pulpits are placed high above the people: And when the Ancient...
Natural History;

206. 
Experiments in Confin, touching the 
Lasing and 
Perishing of 
Sound; and 
touching the 
time they re 
quire to the 
Generation or 
Deposition.

207. 
A 
fter 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 wonder 
ful error amongst Men, who take this to be a continuance of the first Sound; 
wheras (in truth) it is a Renovation, and not a Continuance: For the Body 
percuss'd, hath by reason of the Percussion, a Triplication wrought in the mi 
nute parts, and so reneweth the Percussion of the Air. This appeareth 
manifeftly, 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 Sound ceaseth; and in a Bell, after you have chimed upon it, if you 
touch the Bell, the Sound ceaseth. And in this you must distinguish, that there 
are two Triplications, The one Manifest and Local as of the Bell, when it is 
Penifal; the other Secret, of the Minute parts, such as is described in the 
ninth Inftance. But it is true, that the Local helpeth the Secret greatly. We 
fee likewise, that in Pipes, and other Wind Instruments, the Sound lafteth not 
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.

208. 
I t is certain, that in the noise of great Ordnance, where many are shot 
off together, the sound will be carried (at the leaft) twenty miles upon the 
Land, and much further upon the Water, but then it will come to the Ear; 
not in the inftant of the shooting off, but it will come an hour, or more later: 
This must needs be a Continuance of the firft Sound; for there is no Trepi 
dation which should renew it. And the touching of the Ordnance would 
not extinguifh the sound the firmer: So that in great Sounds, the Continu 
ance is more than Momentary.

209. 
To try exactly the time wherein Sound is delayed, Let a Man f tand in a 
Steeple, and have with him a Taper, and let fame Veil be put before the 
Taper, and let another Man f tand in the Field a mile off; then let him in the 
Steeple, strike the Bell, and in the fame inftant withdrew the Veil, and fo let 
him in the Field tell by his Pulse, what inftance of time there is between the 
Light feen, 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 flash of a piece is seen sooner, than the noise is heard. And in hewing Wood, if one stone distance off, he shall see the Arm lifted up for a second stroke, before he hear the noise of the first; and the greater the distance, the greater is the prevention: As we see in Thunder, which is 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 participateth of some Local Motion of the Air, (as a cause sine qua non) in that it perisheth so suddenly: For in every Section, or Impulsion of the Air, the Air doth suddenly restore and reunite it self, which the Water also doth, but nothing so swiftly.

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

Where Sound passeth thorow a hard, or close Body, (as thorow Water, thorow a Wall, thorow 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 bevery 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 Horsehead empty, whereof the sides were some two foot thick, and the Bung-hole stopped. I conceive, the reounding Sound by the Communication of the outward Air with the Air within, would be little or none, but only you shall hear the noise of the outward knock, as if the Vessel were full.

It is certain, that in the passage of Sounds thorow hard Bodies, the Spirit or Pneematical part of the hard Body it self doth co-operate; but much better, when the sides of that hard Body are struck, than when the percussion is on one side only, without touch of the sides. Take therefore a Hawks-Bell, the holes stopped up, and hang it by a thread within a Bottle-Glafs, and stop the Mouth of the Glafs very close with Wax, and then shake the Glafs, 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 Glafs have a great Belly, left when you shake the Bell, it dash upon the sides of the Glafs.

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 destroy 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 hard Bodies, as we see, that Curtains and Hangings will not stay the found much, but Glafs 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 passeth thorow 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 thro' small Cranies. For the Subtleties of Articulate Sounds, (it may be) may pass thro' small Cranies, not confus'd; 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 differents, 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 prefereth the Sound better from waftie: Let further Tryal be made by hollowing in Mits, and gentle Showers; for (it may be) that will somewhat dead the Sound.

How far forth Flume may be a Medium of Sounds, (especially of such Sounds as are created by Air, and not betwixi 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 it felt maketh.

Whether any other Liquors being made Mediums, cause a diversiety 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.

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 parraketh 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 a 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 Hoarse, and Jarring.

Of a Sinuous Pipe that may have some two Flexions, trial would be made. Likewise of a Pipe made like a Crost, 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 whereunto 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, Cubes, Crosses, Triangles, &c. And their Combinations; as Flat against Flat, and Convex against Convex, and Convex against Flat, &c. And mark well the diversities of the Sounds. Try also the difference in sound of several Cavities of hard Bodies percussed, and take knowledge of the diversities of the Sounds. I my self have tried, That a Bell of Gold yieldeth an excellent sound, not inferior to that of Silver or Brass, but rather better. Yet we fee that a piece of money of Gold, foundeth 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 suspect, that 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.

There is an apparent diversity between the Species Visible and Audible, in this. That the Visible doth not mingle in the Medium, but the Audible doth. For if we look abroad, we see Heaven, a number of 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 harmony by mixture, which Colours do not. It is true nevertheless, that a great light drowneth a smaller, that it cannot be seen; as the Sun that of a Glowworm, as well as a great sound drowneth a lesser. And I suppose likewise, that if there were two Lanterns of Glass, the one a Cinnamon, and the other an Azure, and a Candle within either of them, those colored 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 arctique Lines, must needs encounter, and disturb the one the other.

The sweetest and brist Harmony is, when every Part or Instrument is not heard by itself, but a conflation 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 joined with Sound, hath no great operation upon Sounds: For whether the Air be lightsome or dark, hot or cold, quiet or flitting, (except it be with noise) sweet-smelling, or stinking, or the like; it importeth not much. Some petty alteration or difference it may make.
Natural History;

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 confounding with the other, and making an harmony.

Two Voices of like loudness, will 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 leemeth, that the Impressions from the objects of the Senses, do mingle respectively, every one with his kind; but not in proportion, as is before demonstrated: And the reason may be, because the first impression, which is from Privative to Active, (as from Silence to Noise, or from Darkness to Light;) is a greater degree, than from less noise, to more noise, or from less light, to more light. And the reason of that again may be, For that the Air, after it hath received a charge, doth not receive a surcharge, or greater charge, with like appetite, as it doth the first charge. As for the 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 Reflection, 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 see, that even in the open Air, the Wire-string is sweeter than the string of Guts. And we see, that for Reflection, Water excelleth; as in Musick near the Water, or in Echoes.

It hath been tried, that a Pipe, a little moistned on the inside, but yet so as there be nodrops left, maketh a more solemn found, 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, Musick 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 founded better than New, for the same reason: And to do Lute-strings that have been kept long.

Sound is likewise meliorated by the mingling of open Air with pent 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, left it should make too much resounding, 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 handsonnets 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,
Century III.

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 speaks, for Birds are as well taught in the dark, as by light. The sounds of Speech are very curious and exquisite; so one would think it were a Lesson hard to learn. It is true, that it is done with time, and by little and little, and with many efforts and provers. But all this discharge 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 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 Dotsrels, we see how the foolish Bird playeth the Ape in gestures: And no Man (in effect) doth accompany with others, but he learneth (that 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, or of a Cart-wheel, and (in effect) any other noise they hear.

No Beast can imitate the Speech of Man, but Birds onely: For the Ape it will, that is so ready to imitate other wise, 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 great 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 Instrumens of Speech, (as Lips, Teeth, &c.) liker unto Man than Birds. As for the Neck, by which the Throat paffeth, 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, Jays, Daws, and Ravens: Of which, Parrots have an adorne 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 practifie them more, as appeareth in their Singing. We fee 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.

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

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 greatue of it, but for Imposture, in counterfeiting ghosts or spirits.

These be three kindes of Reflexions of Sounds; a Reflexion Concurrent, a Reflexion Iterant, which we call Eccho, and a Super-reflexion, or an Eccho of an Eccho, 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 practisfed any means to make Artificial Ecchos. And no Eccho 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 Eccho; but being further off, (as upon a large River) they make an Interant Eccho; for there is no difference between the Concurrent Eccho, and the Interant, but the quickness or slowness of the return. But there is no doubt, but Water doth help the Delation of Eccho, as well as it helpeth the Delation of Original Sounds.

It is certain (as hath been formerly touched,) that if you speake thorow a Trunk, slopped at the further end, you shall finde a blast return upon your mouth, but no sound at all. The cause is, for that the clofeness, which preserveth the original, is notable to preserve the reflected sound; besides that, Eccho's are seldom created, but by loud Sounds. And therefore there is no hope of Artificial Eccho's in Air, pent in a narrow concave. Nevertheless it hath been tried, that one leaning over a Well of Twenty five fathom deep, and speaking, though but softly, (yet not so softly as a whisper) the Water returned a good audible Eccho. It would be tried, whether speaking in Caves, where there is no issue, save where you speak, will not yield Eccho'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. Also we see that in Mirrors, there is the like Angle of Incidence, from the Object to the Glass, and from the Glass to the Eye. And if you strike a Ball side-long, not full upon the Surface, the rebound will be as much the contrary way; whether
other there be any such resilience in Eccho's (that is, Whether a Man shall hear better, if he stand aside the Body repercutting, than if he stand where he speaketh, or any where in a right Line between) may be tried; Try in like wise would be made, by standing nearer the place of repercutting, than he that speaketh; and again, by standing further off, than he that speaketh, and (as knowledge would be taken, whether Eccho's, as well as Original Sounds, be not strongest near hand.

There be many places, where you shall hear a number of Eccho's one after another; and it is, when there is variety of Hills or Woods, some nearer, some further off; So that the 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; so likewise doth the Eccho, for you have many Brick-eccho's to the place where you stand.

To make an Eccho that will report three, or four, or five words distinctly, it is requisite, that the Body repercutting be a good distance off: For if it be near, and yet not so near, as to make a Concurrent Eccho, it choppeth with you upon the sudden. It is requisite likewise, that the Air be not much pent: For Air, at 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 hear the report but of two words.

From Eccho's upon Eccho's, there is a rare instance thereof in a place, which I will now exactly describe. It is some Three or four Miles from Paris, near a Town called Pont-Carthenon; and some Bird-bolt shot or more from the River of Seau. 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 Seau, in Stacks, and not in Boats, laid there (as it is meth) for their sale. 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 Eccho's are) in the Evening. It is manifest, that it is not Eccho's from several places, but a toiling of the Voice, as a Ball 100 and more, like to Reflections in Looking-Glasses; where if you place one Glass before, and another behind, you shall see the Glass behind the Image, within the Glass before; and again, the Glass before in that: And divers such Super-Reflections, till the Species specier at last die: For it is every return weaker, and more shady. In like manner, the Voice in that Chappel, createth Species speciei, and maketh succeeding Super-Reflections; for it melieth by degrees, and every Reflection 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 somet ime, and then the last word alone for sometimes, till fading and growing weaker. And whereas in Eccho's of one return, it is much to hear Four or five words. In this Eccho of so many Returns, upon the matter, you hear above Twenty words for three.
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 look 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-Carenou, there was an old Parishan 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 Devil's name: But will say, Vain, which is as much in French, as stage, or avoid. And thereby I did hap to finde, that an Echo would not return S, being but a Hissing and an Interior Sound.

Echoes are some more sudden, and chap again as soon as the Voice is delivered, as hath been partly saide; 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 Echoes come from several places, at the same distance they must needs make (as it were) a Quire of Echo's, and to 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 appeare, 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 Visible and Audibles.

Both of them spread themselves in Round, and fill a whole Florid 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 Sunferies.

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

Both of them are of a sudden and easie Generation and Declension, 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 Virtue and Working, do not appear to emit any Corporal Substance into their medium, or the Orb of their Virtue; neither again to rise or stir any evident Local Motion in their medium, 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 Senses, 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 Glowing, 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 Echo’s.

Neither of them both destroy or hinder the Species of the other, although they encounter in the same medium: As Light or Colour hinder not found, nor è contra.

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 Senes: As VISIBLES work up, on the looking-glass, which is like the Pupil of the Eye; and AUDIBLES upon the places of Echo, which resemble, in some sort, the cavern 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 conducible, 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 contrast 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 external Rarefaction of the Air; which is an action materiale, differing from the action of Sound. If it be true (which is anciently reported) that Birds, with great shouts, have fallen 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 Impressions 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 through 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 Arcuate Lines. Hence it cometh to pass, that Visibles do not intermingle and confound one another, as hath been said before, but Sounds do. Hence it cometh, that the solidity of Bodies doth not much hinder the 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 Handker-chief, 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 Reflexion 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 seeing there is required Light and any thing that toucheth the Pupil of the Eye (all over) excludes 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, he never saw any thing more clear or perfect, than that white Needle. Which (no doubt) was, because the Needle was less than the Pupil of the Eye; and so took not the light from it. The other error may be, For 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 nevertheless there is some distance required in both.

Visibles are (wiser carried to the Sense, than Audibles; as appeareth in Thunder and Lightning, Flame, and Report of a Piece, and Motion of the Air, in burning of Wood. All which have been set down heretofore, but are proper for this Title.
I conceive also, that the Species of Audibles, do hang longer in the Air than those of Visible: For although even those of Visible do hang some time, as we see in Ringsturned, that show like spheres. In Lute-strings filippred, a Fire-brand carried a long, which leaveth a train of light behind it, and in the Twi-light, 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 Orkansas discharged, and heard twenty miles off.

In Visible there are not found Objects so dicious and ingrate to the Sense, as in Audibles. For foul Sights do rather displease, in that they excite the memory of foul things, than in the immediate Objects. And therefore in Pictures, those foul Sights do not much offend; but in Audibles, the grating of a Saw when it is sharpened, doth offend so much, as it seteth the Teeth on edge; and any of the harsh Disords in Musicks, the Ear doth straightways refuse.

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

It seemeth, that the Impression of Colour is so weak, as it worketh not, but by a Cone of direct Beams, or right Lines, whereof the Basis is in the Object and the Vertical point in the Eye; So as there is a corradilation 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 Reflexion, 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, so that the light is seen where the body of the flame is not seen; and where any Colour (if it were placed where the body of the flame is) would not be seen. I judge that Sound is of this latter nature: For when two are placed on both sides of a Wall, and the voice is heard, I judge it is not only the original sound, which paffeth in an Arch'd line, but the sound, which paffeth above the Wall in a Right line, begeteth the like Motion round about it, as the first did, though more weak.

All Concord and Disords of Musick (no doubt) Sympathies and Antipathies of Sounds, and (as likewise) in that Musick, which we call Broken Musick, or Consort Musick; some Concord of Instruments are sweeter than others, (a thing not sufficiently yet observed;) as the Irish-Harp and Base-Viol agree well; the Recorder and Stringed Musick agree well; Organ and the Voice agree well, &c. But the Virginalls 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 Conords) 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 Piston to that String be stricken, 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 Eighth to that String be stricken, either in the same Lute or Viol, or in others lying by: But in none of these there is any sound of Sound that can be discerned, but only Motion.
Natural History;

It was devis'd, That a Vial should have a Lay of Wire-strings below, as close to the Belly as a Lute, and then the Strings of Curs mounted upon a Bridge, as in ordinary Vials; to the end, that by this means, the upper Strings stricken, should make the lower fround by Sympathy, and to 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 Dissonfion or a Unison with the lower, which are never flopped. But if it should be of use at all, it must be Instrum ents which have no stops, as Virginals and Harps; wherein tryal may be made of two rows of Strings, distant the one from the other.

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: And 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.

It feemeth both in Ear and Eye, the Instrument of Sense hath a Sympathy or Similitude with that which giveth the Reflexion (is hitherto known before.) For as the sight of the Eye is like a Chryfalt, or Glass, or Water, so is the Ear a luminous Cave with a hard Bone, to stop and reverberate the Sound: Which is like to the places that report Echo's.

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

We hear better when we hold our Breath, than contrary, in so much, as in all listen ing 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 kind of labor.

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 part 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 farther distance; than without that Instrument; being (as it were) an Ear ftertacle. And I have heard there is in Spain, an Instrument in use to be fet to the Ear, that helpeth somewhathole that are Thick of Hearing.

If the Mouth be shut close, nevertheless there is yielded by the Roof of the Mouth, a Murmur; such as is used by Dumb men: But if the Noftrils be likewise flopped, no such Murmur can be made, except it be in the bottom of the Pallace towards the Throat. Whereby it appeareth manifestly, that a Sound in the Mouth, except such as afor efaid, if the Mouth be flopped, passeth from the Pallace through the Noftrils.

The Repertion of Sounds, (which we call Echo) is a great Argument of the Spiritual Essence of Sounds. For if it were Corporeal, the Repertion should be created in the fame 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 refuted by the Ancients. For it is true, that Seals make excellent Impressions; and to it may be thought of Sounds in their first generation: But then the Delation and Continuance of them, without any new sealing, shew apparently they cannot be Impressions.

All Sounds are suddenly made, and do suddenly perish; but neither that, nor the exquisite Differences of them, is matter of so great admiration: For the Quaverings, and Warblings 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; deserve more admiration. As for example, If a man stand in the middle of a Field, and speak aloud, he shall be heard a Furlong in round, and that shall be in articulate Sounds, and those shall be entire in every little portion of the Air; and this shall be done in the space of less than a minute.

The sudden Generation and Perishing of Sounds, must be one of these two ways: Either, that the Air suffereth some force by Sound, and then returneth it off as Water doth; which being divided, maketh many circles, till it returneth itself to the Natural confistence; 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 mate riate qualities of the Air straight ways suffocat 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 Virtue which may be called Incorporeal and Immaterial, whereof there be in Nature but few. Besides, we were willing (now in these our first Centuries) to make a pattern or president of an Exact Inquisition; and we shall do it withal 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 minds to the amplitude of the World; and not to reduce the World to the narrowness of their Minds.
Metals 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 Rutts; as Vermilion, Verdegale, Bile, Cirrus, &c. And likewise in their Vitrifications. The cause is, for that by their Strength of Body, they are able to endure the Fire, or Strong-waters; and to be put into an 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 light-torne.

IT conduceth unto long Life, and to the more placide Motion of the Spirits, which thereby do less prey and consume the Juice of the Body: either that Men's actions be free and voluntary, that nothing be done invita 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 scene 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 Stillicides (as hath been said) the falling of them in round drops (which is the form of Union) and the staying of them for a little time in Bubbles and Froth. In the second degree or kinde, 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 Pitch, Gum, 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 Foliate, or any Metal Foliate, cleaveth: But those Bodies which are noted to be clammy, and cleaving, are such as have a more indifferent Appetite (at once) to follow another Body, and to hold to themselves. And therefore they are commonly Bodies ill mixed, and which take more pleasure in a Foreign Body, that in preserving there own consistence, and which have little predominance in Drought or Moisture.

Time and Heat are fellows in many effects. Heat drieth Bodies that do easilly expire; as Parchment, Leaves, Roots, Clay, &c. And so doth Time or Age aretie; as in the same Bodies, &c. Heat dissolveth and melteth Bodies that keep in their Spirits, as in divers Liquifacions; 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 causth the Spirits to search some issue out of the Body, as in the Volatility of
of Metals; and so doth Time, as in the Rust of Metals. But generally Heat doth that in small time, which Age doth in long.

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-Meats, Salt, &c. The cause is, for that in those things which wax hard with Time, the work of the Fire is a kind of melting; and in those that wax soft with Time, (contrariwise) the work of the Fire is a kind of Baking; and whatsoever the Fire baketh, Time doth in some degree dissolve.

Motion passes 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 it 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 drowzy 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 sight of another. So the Laughing of another maketh to laugh.

There be some known Diseases that are Infectious, and others that are not. Those that are infectious, are first, such as are chiefly in the Spirits, and not so much in the Humors, and therefore pass easily from Body to Body; such are Pestilences Lippitudes, and such like. Secondly, such as taint the breath, which we see passeth manifestly from Man to Man; and not invisible as the affects of the Spirits do; such are Consumptions of the Lungs, &c. Thirdly, such as come forth to the skin, and therefore taint the Air, or the Body adjacent; especially, if they consist in an unctuous substantia, not apt to disperse; such are Scabs, and Leprosies. Fourthly, such as are mostly 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 venom 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 perfecter 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 Exercise is good for some Bodies, and sitting and lying motion, for others. If the Body be hot, and void of superfluous Moistures, too much Motion hurteth; and it is an error in Physicians, to call too much upon Exercise. Likewise, Men ought to beware, that they use nor Exercise, and a spare diet, both; but if much Exercise, then a plentiful diet; and if sparing diet, then little Exercise. The Benefits that come of Exercise are. First, that it lendeth nourishment into the parts more forcibly.
Secondly, That it helpeth to exccrn by Sweat, and so maketh the parts assimilate the more perfectly. Thirdly, that it maketh the sublimen of the Body more solid and compact; and so lest apt to be consumed and depredated by the Spirits. The Evils that come of Exercise, are, First, That it maketh the Spirits more hot and predatory. Secondly, That it doth absorb likewise, and attenuate too much the moiiture 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 diter 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) glut writ sooner, as Sweet-Meats, Fat-Meats, &c. The cause is, for that Appetite con- sisteth in the emptiness of the Mouth, or possessing it with somewhat that is astringent; and therefore, cold and dry: But things that are sweet and fat, are more filling, and do 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-custom; 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 only in Meats and Drinks, but also in Motions, Loves, Company, Delight, Studies, what they be that Custom maketh more grateful; and what more tedious, were a large Field. But for Meats, the cause is Attraction, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a relish by former use. And (generally) it is a rule, That whatsoever is somewhat ingrate at first, is made grateful by Custom; but whatever is too pleasing at first, groweth quickly to Satiety.
Acceleration of Time, in Works of Nature, may well be esteemed Inter Maligna 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, Juice of Fruits, or Herbs expressed, &c. And by Time, they settle and clarify. 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 reprefenteth Bodies clear and untroubled. The third, by the refining the Spirit it self, which thereby giveth to the Liquor more Splendor, and more lufire.

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 see. vered)
erected) drawn with the greater parts of the liquor: And lastly, by perco-
lation or distillation.

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, be-
cause 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.

Thirdly, For the refining of the spirit, it is wrought likewise by heat,
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 effectuating of it; take these Infusions and Trials.

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 without
they cast up some spittle: and this Infusion is to be referred to separa-
tion.

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
turbid, yet they refine the spirits. Take therefore a vessel of new beer, and
and another vessel of new beer, and rack the one vessel from the lees, and
pour the lees of the racked vessel into the un racked vessel, and see the effect.
This Infusion is referred to the refining of the spirits.

Take new beer, and put in some quantity of flake beer into it, and see
whether it will not accelerate the clarification, by opening the body of the
beer, and cutting the greater parts, whereby they may fall down into lees.
And this Infusion again is referred to separation.

The longer molis or herbs, 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. Therefore is plain, because in infusion, the longer it is, the
greater is the part of the gross body that goeth into the liquor; But in de-
coction, though more goeth forth, yet it either purgeth at the top, or setteth
at the bottom. And therefore the most exact way to clarify is, first, to in-
sufce, and then to take off the liquor and decoct it; as they do in beer, which
hath molis first infused in the liquor, and is afterwards boiled with the hop.
This also is referred to separation.

Take hot embers, and put them about a bottle filled with new beer, al-
most to the very neck; let the bottle be well stopped, left it lie 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. This
Infusion is referred, both to the even distribution, and also to the refining
of the spirit by heat.

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 top, 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 per-
factly in all the parts. Let it stand some twenty four hours, then take it, and
put it again into a bottle with air, and thence into another bottle, and so
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 also to try it in a Bottle with a little air below the Neck without emptying. This Instance is referred to the even Distribution and Refining of the Spirits by Motion.

As for Percolation, inward, and outward (which belongeth to Separation,) Trial would be made of Clarifying by Adhesion, with Milk put into new Beer, and flittered with it: For it may be, that the grofer part of the Beer will cleave to the Milk; the doubt is, whether the Milk will never well again, which is soon tried. And it is usual in clarifying Hippocrates to put in Milk, which after severeth and carrieth with it the grofer parts of the Hippocrates, as hath been said elsewhere. Also for the better Clarification by Percolation; when they Tun new Beer, they use to let it pass through a Strainer, and it is like the finer the Strainer is, the clearer it will be.

The Accelerating of Maturation, we will now enquire of, and of Maturation it is. It is of three natures, the Maturation of Fruits, the Maturation of Drinks, and the Maturation of Impofhumens and Vees. This last we refer to another place, where we shall handle Experiments Medicinal. There be also other Maturations, 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 grofer parts; and it is effected partly by the same means that Clarification is (whereof we spake before.) But then note, that an extrem Clarification doth fper the Spirits so smooth, as they become dull, and the drink dead, which ought to have a little flowing. And therefore all your clear Amber drink 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 Oyly, Vinegar hath them congregated, but more Jeune, and in smaller quantity; the greatest and finest Spirit and part being exhaled: For we see Vinegar is made by fetten the Vefiel of Wine againft the hot Sun. And therefore Vinegar will not burn, for that much of the finer part is exhaled.

The refreshing and quickening of Drink palled 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 also Bottelling of Beer or Ale, while it is new and full of Spirit, (so that it spitteth when the Hopple 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, let by old Beer, maketh it work again: It were good also to enforce the Spirits by some mixtures, that may excite and quicken them, as by the putting into the Bottles, Nitre, Chalk, Lime, &c. We see Cream is matured, and made to more quickly by putting in cold Water; which, as it fecometh, getteth down the Wine.

It is tried, 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 beit of
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 rarifieth the rest that remain: But cold maketh the Spirits vigorous, and irritateth them, whereby they incorporate the parts of the Liquor perfectly.

As for the Maturation of Fruits, it is wrought by the calling forth of the Spirits of the Body outward, and so spreading them more smoothly; and likewise by digesting, in some degree, the grosser parts: And this is effected by Heat, Motion, Attraction, and by a Rudiment of Putrefaction: For the Inception of Putrefaction hath in it a Maturation.

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 hung up in smoke. Of all which the Experiment sorted 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 in the smoke, turned like an old Mellow-Apple wrinkled, dry, loft, sweet, yellow within. The cause is, for that such a degree of heat, which doth neither melt nor scorch (for we see that in a greater heat, a roast Apple softneth and melteth, and Pigs feet made of quarters of Wardens, scorch-and have a skin of coal) doth Mellow, and not adure: The smoke also maketh the Apple (as it were) sprinkled with Soot, which helpeth to mature. We see, that in drying of Peers and Prunes, in the Oven, and removing of them often as they begin to sweat, there is an alike 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 sweetnefs. The cause is, for that Degree of Heat, which is in Lime and Ashes, (being a smoothing heat) is of all the rest most proper: for it doth neither Liquefie nor Areifie, 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 speed them equally thorough out 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 growth, ripeneth faster. Boturis contra Boturum cicis naturale.

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 smoothing, and which dureth 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.
The World hath been much abused by the opinion of Making of Gold. The Work itself, I judge to be possible; but the Means (hitherto pronounced) to effect it, are in the Practice, full of Error and Impofture; 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 Leperies 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, Superstitious Interpretations of Scriptures, Auricular 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 Version 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 Chineses, who despair of making of Gold, but are mad upon the making of Silver. For certain it is, That it is more difficult to make Gold, (which is the most ponderous and material amongst Metals) of other Metals, let them be ponderous and less material, than (Vis versa) to make Silver of Lead, or Quick-silver; both of 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 Actions 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
great person, by undertaking, that he could make Gold: Whose discourse was, That Gold might be made, but that the Alchymists over-fired the work: For (he said) the making of Gold did require a very temperate Heat, as being in Nature a subterraneous 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 devile 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 discourses.

We accord therefore to our Axioms of Maturacion, in effect touched before.

The first is, That there be used a Temperate Heat; for they are ever Temperate Heats that Diſguift, and Maturare; 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 diſguift the Parts.

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

The fourth is, That no part of the Spirit be emitted but discerned: For if there be Emifion of Spirit, the Body of the Metal will be hard and churlifh. And this will be performed, partly by the temper of the Fire, and partly by the clofencs of the Vefsel.

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

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

These principles moſt certain and true, we will now derive a direction of 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 alfo, with the Silver, a tenth part of Quicksilver, and a twelfth part of Nitre by weight: Both these to quicken and open the Body of the Metal: and let the Work be continued by the space of Six Moneths, at the least. I wish alfo, That there be as sometimes an Injection of some Oyled Subſtance, such as they use in the recovering of Gold, which by vexing with Separations hath been made churlifh: And this is, to lay the parts more close and smooth, which is the main work. For Gold (as we fee) is the cloſeft (and therefore the heaviest) of Metals; and is likewise the moft flexible and tenſible. Note, That to think to make Gold of Quicksilver because it is the heaviest, is a thing not to be hoped; for Quicksilver will not endure the manmage of the Fire: Next to Silver, I think Copper were fittest to be the Material.
Old hath these Natures: Greatness of VWeight, Clofeness of Parts, Fixation, Friantness or Softness; Immunity from Ruft, Colour or Tincture of Yellow. Therefore the true way (though moft about) to make Gold, is to know the caufes of thefe Natures before rehearfed, and the Axioms concerning the fame. For if a Man can make a Metal that hath all thefe Properties, let Men debate, 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 breeding of the Spirits, (which is a degree of getting forth) have five differ fend operations. If the Spirits be detained within the Body, and move more violently, there followeth Colliquation; as in Metals, &c. If more mildly, there followeth Digestion or Maturation; as in Drinks and Fruits. If the Spirits be not meerly detained, but Prount a little, and that Motion be confused, and inordinate, there followeth Putrefaction; which ever dissolveth the Confidence of the Body into much inequility; as in Flesh, Rotten Fruits, Shining VWood, &c. and also in the Ruft of Metals. But if that Motion be in a certain order, there followeth Vivification and Figuration; as both in Living Creatures bred of Putrefaction, and in Living Creatures perfect. But if the Spirits issue out of the Body, there followeth Deification, Induration, Consumption, &c. As in Brick, evaporation of Bodies Liquid, &c.

The Means to endue and accelerate Putrefaction, are, firft, By adding fome crude or watry moifure; as in VVetting of any Flesh, Fruit, Wood, with Water, &c. For contrariwise, Undulous and Oly Substances prefervel.

The second is, By Invitation or Excitation; as when a roten Apple lieth close to another Apple that is found; or when Dung (which is a Subfance 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 farthorner time than other Earth will.

The third is, By Clofencfs and Stopping, which detaineth the Spirits in Prison, more then they would, and thereby irritate them to fieklyce; as in Corn and Cloaths which wax mufly; and therefore open Air (which they call Air perfidelis) doth prefervel: And this doth appear more evidentlly in Agues, which come (most of them) of obftructions and penning the Humors, which thereupon Putrifelic.

The fourth is, By Solution of Continuity; as we fean an Apple will not sooner, if it be cut or pierced, and so will Wood, &c. And so the Fleth 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 prefervel the confidence of the Body; so that when their Governments is difloved every part returneth to his Nature, or Homogeneity. And this appeareth in Urine and Blood, when they cool and thereby break. It appeareth also in the Gangreen or Montification of Fleth, either by Opiates, or by Interfc Coldel. I conceive alfo, the fame effe

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Century IV.

328. Experiment Solitary, touching the Nature of Gold.


330. The Means to endue and accelerate Putrefaction, are, firft, By adding some crude or watry moisture; as in VVetting of any Flesh, Fruit, Wood, with Water, &c. For contrariwise, Undulous and Oly Substances preserve.

331. The second is, By Invitation or Excitation; as when a roten 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 farthorner time than other Earth will.

332. The third is, By Clofencfs and Stopping, which detaineth the Spirits in Prison, more then they would, and thereby irritate them to sicklyce; as in Corn and Cloths which wax mufly; and therefore open Air (which they call Air perfidelis) doth preserve: And this doth appear more evidentlly in Agues, which come (most of them) of obstructions and penning the Humors, which thereupon Putrifelc.

333. The fourth is, By Solution of Continuity; as we see an Apple will not sooner, if it be cut or pierced, and so will Wood, &c. And so the Fleth of Creatures alive, where they have received any wound.

334. The fifth is, Either by the Exhaling, or by the driving back of the principal Spirits, which preserve the confidence of the Body; so that when their Governments be dissolved every part returneth to its Nature, or Homogeneity. And this appeareth in Urine and Blood, when they cool and thereby break. It appeareth also in the Gangreen or Mortification of Flesh, either by Opiates, or by Interfer Cold. I conceive also, the same effect

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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 Antichy.

The sixth is, When a Foreign Spirit, stronger and more eager than the Spirit of the Body, enthrall the Body, as in the stinging of Serpents. 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 extinguish 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 Diiification (whereof Putrefaction is the Bastard Brother) is effected by such soft heats; as the hatching of Eggs, the heat of the Vvomb, &c.

The eighth is, By the relaxing of the Spirits, which before were close kept by the coldness of their coverutre, and thereby their appetite of issuing checked; as in the artificial rays induced by strong waters in Iron, Lead, &c. And therefore wetting hastening Rut or Putrefaction of any things, because it looseth the Crust, for the Spirits to come forth.

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

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

All Moulds are Inceptions of Putrefaction; as the Moulds of Pyes and Flesh the Moulds of Oranges and Lemmons, which Moulds afterwards turn into Vworms, or more odious Putrefactions: And therefore (commonly) prove to be of ill odor. And if the Body be liquid, and not apt to putrify 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 forted 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 Putrefaction; for therein consisteth the Means of Conservation of Bodies: For Bodies have two kindes of Dissolutions, the one by Consumption and Distillation, the other by Putrefaction. Buras for the Putrefactions of the Bodies of Men and Living Creatures (as in Agues, Vworms; Consumptions of the Lungs, Imposthums, and Ulcers, both inwards and outwards) they are a great part of Physick and Surgery: And therefore we will referre 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 faid of the Means to enduce or accelerate Putrefaction: For the removing that which caused Putrefaction, both prevent and avoid Putrefaction.

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The first Means of prohibiting or checking Putrefaction is cold; for so we see that Meat and Drink will last longer, unpurified, or unfouled; 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 conflation of the Tangible parts.

The second is Attrition: For Attrition prohibiteth Dissolution: as we see (generally) in Medicines, whereto such as are Astringents do inhibit Putrefaction: And by the same reason of Astringency, some small quantity of Oyl of Vitriol, will keep fresh water long from purifying. 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 stopped, last long; that the Garners under Ground keep Corn longer, than those above Ground; and that Fruit closed in Wax, keepeth fresh: And likewise, Bodies put in Honey, and Flower, keep more fresh: And Liquors, Drinks, and Juices, with a little Oyl cast on the top, keepeth fresh. Contrariwise, we see that Cloath and Apparel, not aired, do breed Moaths and Mould; and the Diversity is, 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 Emussion 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 subtle 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 Garner, or Letting it run like an Hour-Glafs, from an upper Room into a lower, doth keep it fweeter: And running Waters putrifieth not; and in Mens Bodies, exerciseth hindrith Putrefaction; and contrariwise Rest, and want of Motion or stoppings (wherby 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: so convenient drying (whereby the more Radical Moisture is only kept in) purgeth 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 best. 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 tepide heat enclineth them to Putrefaction: So a strong Spirit likewise preserveth, and a weak or faint Spirit dissipeth corruption. So we finde, that Salt-water corrupteth not so soon as fresh, and salting of Oysters, and powdering of Meat, keepeth them from Putrefaction. It would be tryed also, whether Chalk, put into Water, or Drink, doth not preserve it from Purifying, or speedy Souring. So we see that Strong-Beer will last longer than small, and all things, that are hot and aromaticall, do help to preserve 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 pass'd the Fire, do last longer than those that have not pass'd the Fire; as dried Pears, &c.

The eighth is, The drawing forth continually of that part, where the Putrefaction begins; Which is (commonly) the loose 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 anything 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 begins first from the Spirits, and then from the moisture; and that that is dry, is unapt to putrifie. And therefore smoak preserveth flesh; as we see in Bacon, and Neats-Tongues, and Marten's-Beef, &c.

The opinion of some of the Ancients, That blown Airs do preserve Bodies longer than other Airs, seemeth to me probable; for that the blown Airs being over-charged and compressed, will hardly receive the exhaling of any thing, but rather repulse it. It was try'd in a blown Bladder, whereinto flesh was put, and likewise a Flower, and it for't 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 preferred; 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 only while it is in scrawling; and Salt-water while it is in dashing; Glowworms have their shinining while they live, or a little after; onely Scales of Fishes (putrified) seem to be of the same nature with shinining Wood. And it is true, that all Putrefaction hath with it an inward motion, as well as Fire or Light. The tryal for'ted thus.

1. The shinining is in some pieces more bright; in some more dim; but the most bright of all doth not attain to the light of a Glowworm. 2. The Woods that have been try'd 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 shinining 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 Crois, or into Beads, &c. But you must not look to have an Image, or the like, in any thing that is Lightsom; for even a Face in Iron red hot, will
will not be seen, the light confounding the small differences of lightsome and darksome, which flew 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 seemeth the putrefaction spredeth. 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 House, 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, seemeth to conduce to make it shine; the cause is, for that all solution of continuity, doth help on putrefaction, as was touched before. 11. No Wood hath been yet tried to shine that was cut down alive, but such as was rooted both in Stock and Root while it grew. 12. Part of the Wood that shined, was steeped in 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 argues strength; the latter is ill, and cometh by accident or disease. And therefore the Ancient observation is true, that the Childe born in the Seventh Moneth, doth commonly well; but Born in the Eighth Moneth, doth (for the most part) die. But the cause assigned is fabulous, which is, That in the Eighth Moneth should be the return of the reign of the Planet Saturn, which (as they say) is a Planet malign; whereas in the Seventh is the reign of the Moon, which is a Planet propitious. But the true cause is, for that there is so great a prevention of the ordinary time, it is the luttones of the Childe; 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 Quickening and Exciting of the Natural heat. For the first, Excess of Nourishment, is hurtful; for it maketh the Childe corpulent, and growing in breadth, rather than in height. And you may take an Experiment from Plants, which if they spread much, are seldom tall. As for the Nature of the Nourishment; First, it may not be too dry, and therefore Children in Dairy Countreys do wax more tall, than where they feed more upon Bread and Flesh. There is also a received tale, that boiling of Dife-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 putteth 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 live so much, hindereth the growth of Children; whereas Country-People, that go 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 Alik, 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 be two great Families of Things, you may term them by several names, Sulphureous and Mercureal, which are the Chymists' words: (For as for their Salt, which is their third Principle, it is a Com- pound of the other two,) Inflammable, and Not Inflammable; Mercure and Crude, Oily and Watry: For we see that in Subterraneities 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 Pneumaticals, 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 Differencies of Matter, yet they seem to have many confections; 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 incense, and they both have quickness of Motion, and facility of Celion, much alike: And the Interstellar Skey, (though the opinion be vain, that the Star is the Denier Part of his Orb,) 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 Natura, 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 kindes. First, In the Mixture of Earth and Water, which mingled by the help of the Sun, gathered a Nitrous Pates, more than either of them have severally; As we see, in that they put forth Plants, which need both Juyses.

The second is in the Assimilation of Nourishment, made in the Bodies of Plants, and Living Creatures: whereof Plants turn the Juyce of meet 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.
But these two ways of Version of Water into Oil, (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 Oil. The fourth is in the Dulcoration of some Metals; as Sottharam Saturni, &c.

The Intention of Version of Water into a more Oily substance is by Digestion: For Oil is almost nothing else but Water digested and this Digestion is principally by Heat; which Heat must be either outward or inward. Again, it may be by Provocation or Excitation, which is caused by the mingling of Bodies already Oily or Digested, for they will somewhat communicate their Nature with the rest. Digestion also is strongly effected by direct Affimilation of Bodies Crude into Bodies digested; as in Plants and Living Creatures, whose nourishment is far more Crude than their Bodies. But this Digestion is by a great compacts 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 profoundest enquiries of Nature,) we leave it to the title of Version of Bodies; and likewise to the title of the First Congregations of Matter, which like a General Assembly of Estates, doth give Law to all Bodies.

A Chameleon is a Creature about the bigness of an ordinary Lizard, his Head unproportionably big, his eyes great; he moveth his Head without the writhing of his Neck (which is inflexible) as a Hag doth: His Back crooked, his Skin spotted with little Tumors, less 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 lanch out to prey upon Flies. Of colour Green, and of a dusky Yellow, brighter and whiter towards the Belly; yet spotted with Blew, Whire, 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, only the Green spots receive a more orient luster; 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 they fed upon any thing else but Air, and might observe their Bellies to swell after they had exhausted the Air, and clofed their Jaws, which they open commonly against the Rayes of the Sun. They have a foolish Tradition in Magick, that if a Chameleon be burnt upon the top of an Houfe, it will raise a Tempest, supposing (according to their vain Dreams of Sympathies) because he nourished with Air, his Body should have great vertue 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 thick smoke, and ashes, and pumice, as Mountain Flames do. The reason (no doubt) is, because the Flame is not pent, as is it in Mountains, and Earthquakes which cast Flame. There be also some blinde Fires,
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 soul Cloaths be put into it, it scoureth them of itself: And if they lay any whist 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 subtle Spirit, which severeth and divideth any thing that is soul, and viscous, and sticketh upon a Body.

Take a Bladder, the greatest you can get; full it full of Wind, and twe it about the Neck with a Silk thred waxed; and upon that likewife 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 consequencce.

It is a report of some good credit, that in deep Caves there are Penile Chrystal, and degrees of Chrystal that drop from above, and in some ether (though more rarely) that rise from below. Which though it be chiefly the work of cold, yet it may be, that Water that palfeth throrow 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 an hollow Vessel, putting a Canvase 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 lets 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 will utmost, 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 thereabouts. Then put them into a sweet dry Earthen Bottle or a Glafs with narrow mouths, stuffing them close together, but without bruising: Stop the Bottle or Glafs close, and these Roses will retain, not onely their smell perfect, but their colour fresh for a year at leaft. Note, that nothing doth so much destroy any Plant, or other Body, either by Purification, or Atefallion, as the Ardentious Moisture, which hangeth loose in the Body; if it be not drawn out. For it betrayeth and tolleth forth the Innate and Radicall Moisture along with it when it self goeth forth. And therefore in Living Creatures, moderate sweate doth preserve the Juice 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 receive 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 Gun-powder, which dissolov into a Black-water 110 Pulses. A Cube or Pellet of Yellow Wax, was taken, as much as half the Spirit of Wine, and set in the 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 cruddled. 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 Pebble 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 restistance 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 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 it felt, will burn no more, and tasteth 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 self with the Spirit of Wine, to produce one Flame; but wherover the Wax floated, the Flame forsook 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 provoketh Inflammation. And this importeth not only discovery, but also use and profit; for it is a great saving in all such Lights, if they can be made as fair and bright as others, and yet last longer. Wax pure made into a Candle, and Wax mixed severally into Candle-duff, with the particulars that follow, (Viz. Water, Aqua-vite, Milk, Bay-salt, Salt, Butter, Nitre, Brimstone, Saw-dust) every of these bearing a sixth part to the Wax; and every of these Candles mixed being of the same weight and wick, with the Wax pure; proved thus in the burning, and lasting. The life of it in consuming was that with Saw-dust, which first burned fair till some part of the Candle was consumed; and

or no smell; so that the smell is a second smell that issueth out of the Flower afterwards.
and the duff gathered about the snuffe; but then it made the snuffe big, and long, and to burn duskyly, and the Candle waited in half the time of the Wax pure. The next in swiftnes, were the Oyl and Butter, which consumed by a fifth part swifter than the pure Wax. Then followed in swiftness the clear Wax is left; then the Bay-falt, 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 flowest. And in these four last, the VVick would spit forth little sparks: For the Nitre, it would not hold lighted above some twelve Pulles: 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 flame with the Nitre; but then after a little while, it would harden and cake about the snuffe: So that the mixture of Bay-falt with VVax, will win an eight part of the time of lasting, and the VVater a fifth.

After the several materials were tried, Tryal was likewise made of several VVicks: as of ordinary cotton, Sorrow Thrde, 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 Thrde consumed faster than the Cotton. by a fifth 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 Thrde, cast a Flame much alike, and the Rush much less and dimmer. Quere, whether VVood and VVicks both, as in Torches consume faster, than the VVicks Simple?

We have spoken of the several Materials, and the several VVicks; 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 Houfwives to make their Candles burn the longer, use to lay them (one by one) in Bran or Flower, which make them harder, and so they consume the flower. 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 vertue to harden, so that both age, and lying in the Bran doth help to the lasting. And we see that VVax Candles last longer then Tallow-Candles, because VVax 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 Turret or Candle.

Take a Turreted Lamp of Tin made in the form of a Square; the height of the Turret, 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 from thence from the Turret. Reverse it, and fill it full of Oyl, by that hole; and then set it upright again, and put a Wick in at the hole, and lighten it: You shall finde, that it will burn long, 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 Oyl waineth and descendeth, so the top of the Turret, by little and little filleth with Air; which is cauled by the Rarefaction of the Oyl by the heat. It were worthy the observation to make a hole, in the top of the Turret, 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 wafteth 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 doth 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.

Burials 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 Conformation, 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 putritie, than good by the virtual cold, to conserve them, except the Earth be very dry and fancy.

An Orange, Lemmon, and Apple, wrapt in a Linning 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 putritied.

A Bottle of Beer buried in like manner as before, became more lively, better talled, 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 were a profitable Experiment, to preserve Oranges, Lemmons, and Pomeranates, 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 Conserveratory of Snow. And generally, whomever will make Experiments of Cold, let him be provided of three things, a Conserveratory of Snow, a good large Vault, twenty foot at least under the Ground, and a deep Well.
There hath been a Tradition, that Pearl, and Coral, Surchois-Stone, that have lo't their Colours, may be recovered by burying in the Earth; which is a thing of great profit, if it would: But upon tryal of six 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 contingent and so make the Body more united, and thereby more resplendent.

**M**

**En 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.

**I**

**T** is commonly seen, that more are sick in the Summer, and more dye 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 dye of them in Summer, is because they are bred most in the Summer; for otherwise, those that are touched are in most danger in the Winter.

**T**

The general opinion is, That Years hot and moist, are most Pestilent; 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, that for the drought in the Bodies of Islanders, habituate to moist Airs, doth exasperate the Humors, and maketh them more apt to Putrefy or Enflame; besides, it tainteth the VVaters (commonly) and maketh them less wholesome. And again in Barbary, the Plagues break up in the Summer Months, when the VVeather is hot and dry.

**M**

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

**T**

Rival hath been made with Earthen Bottles, well stopped, hanged in a VVell of Twenty Fathom deep, at the least; and some of the Bottles have been let down into the VVater, some others have hanged above, within about a Fathom of the VVater; and the Liquors so tryed have been, Beer, (not new, but ready for drinking) and VVine, and Milk. The proof hath been, that both the Beer, and the VVine, (as well within VVater, as above) have not been palled or deaded at all; but as good, or somewhat better than Bottles of the same Drinks and Italeness, kept in a Cellar. But those which did hang above VVater, 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 putrifile. Nevertheless it is true, that there is a Village near Blou, where in deep Caves they do thicken Milk, in such sort, that it became most plesant; which was some caufe of this tryal 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 its self, is with a Compound Body of Cream, Cruds, and Whey, as it is easilie turned and dissolue. 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 Stur. 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 Stur: And we see, that in those that Stur, if they drink Wine moderately, they Stur less, because it heateth: And so we see, that they that Stur, do Stur 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 makes it less apt to move, as well as cold; for it is an affay that cometh to some wise and good Men, as it did unto Moses, who was Lingua Propedita: And many Strutters (we finde) are very Cholerick Men, Choler 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 touch'd 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 reheas, is, For that all sweet Smells have joyned 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 Lemmons, the nipping off their Rinde, giveth out their Smell more: And generally, when Bodies are moved or stirr'd, though not broken, they smell more, as a Sweet-Bag waved. The cause is double; for that there is a greater emission of the Spirit, when way is made: And this holdeth in the Breaking, Nipping, or Cruising; 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 fent faster upon us.

The daintiest Smells of Flowers, are out of those Plants whose Leaves smell not, as Violets, Roses, Wall-flowers, Gilly-flowers, Pinks, Wood-bine, Vine-flowers; Apple-blossoms, Limes-tree-blossoms, Bean-blossoms, &c. The cause is, for that where there is heat and strength enough in the Plant to make the Leaves odorate, there the smell of the Flower is rather vanilie and weaker, than that 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 ferved from the groffier Juyce in the Efflorescence, and not before.
Most Odors smell best, broken, or crusty, as hath been said; but Flowers pressed or bear'd, do lose the freshness and sweetness of their Odor. The cause is, for that when they are crusty, the grosser and more earthy Spirit cometh out with the Finer, and troubleth it; whereas in stronger Odors there are no such degrees of the issue of the smell.

I t is a thing of very good use, to discover the goodness of Waters. The taste to those that drink Water only 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 fafest, you may account the best.

Thirdly, Try them in several Bottles or open Vessels, matches in every thing else, and see which of them last longest without trench or corruption; and that which holdeth unpurified longest, you may likewise account the best.

Fourthly, Try them by making Drinks, stronger or smaller, with the fame quantity of Milk; 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 VVaters (commonly) is the VVater of large and navigable Rivers; and likewise in large and clean Ponds of standing VVaters: 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 furthest in Drink. For that also helpeth concoction, so it be out of a deep VVell; for then it curseth the rawness of the VVaters; but Chalky-water towards the top of the Earth, is too fretting, as it appeareth in Laundry of Cloaths, which wear out apace, if you use such VVaters.

Fifthly, The Houfwives 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 best, for the hungry water doth kill the undutious 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 Physitians esteemed the fainet and the best; but yet it is said to putrifie soonest, which is likely, because of the fineneft of the Spirit; and in Conafervatories of Rain-water, (fuch as they have in Venice, &c.) they are found not to choice Waters; (the worse perhaps) because they are covered aloft, and kept from the Sun. Snow-water is held unwholefome, infomuch, as the people that dwell at the Foot of the Snow Mountains, or otherwise upon the alpet, (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 maked Meat red, which is an ill Sign. Springs on the tops of high Hills are the best; for both they feme to have a Lightnefs and Appetite of Mounting; and besides, they are most pure and unmimgled: And again are more percolated through a great space of Earth. For VVaters in Valleys, joyne in effect under ground with all VVaters of the hight Level; whereas Springs on the tops of Hills, pass through a great deal of pure Earth with lea mixture of other VVaters.

Seventhly, Judgment may be made of Waters by the Soily whereupon the VVater runneth, as Pebble is the cleanest and best tafted; and next to that Clay.
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 Riffing-groundes of great Cities, which must needs take in a great deal of salt.

IN Peru, and divers parts of the West-Indies, though under the Line, the Heats are not so intolerable, as they be in Barbary, and the Skirts of the Torrid Zone. The causes are, first, the great Brizes which the motion of the Air in great Circles (such as are under the Girdle of the World) produceth, which do refrigerate; and therefore in those parts, Noon is nothing so hot when the Brizes are great, as about nine or ten of the clock in the Forenoon. Another cause is, for that the length of the Night, and the Dews thereof, do compence the Heat of the day. A third cause is, the stay of the 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 Countrie, as in Ethiopia and Guinea, &c. Fire doth it not as we see in Glass-Men, that are continually about the Fire. The reason may be, because Fire doth lick up the Spirits and 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 concereth it, than forsketh it: And therefore, we see that all Ethiopians are fleshy, plump, and have great Lips. All which are beaten with moisture retained, and not drawn out. We see also, that the Negroes are bred in Countrie, 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 moist, in me publick, as it is perilous through moisture; But the Countrie of the Abyssines, and Barbary, and Peru, where they are Tawney and Olive coloured, 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 Serpents, Eels, Worms, Flies, &c. First, therefore it is certain, that the immediate cause of Death, is the resolution or extinguishment of the Spirits; and that the destruction or corruption of the Organs, is but the mediate cause. But some Organs are so peremptorily necessary, that the extinguishment of the Spirits doth speedily follow: but yet so, as there is an interim of a small time. It is reported by one of the Ancients of credit, that a Sacrificed Beast hath lived 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 Man's Hand, trembling, without breaking any part of it; or severing it from the Marrow of the Back-bone: during which time, the Pig hath been, in all appearance, stark dead, and without motion: And after a small time the Brain hath been replaced,
and the Skull of the Pig closed, and the Pig hath a little after gone about. And certain it is, that an Eye upon Revenge, hath been thrust forth, so as it hanged a pretty distance by the 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; infomuch, 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 Eftrich, 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 day's Work; they are the first Producers, which is the word of Animation, for the other words are but the words of Eulence; and they are of excellent and general use. For Food, Medicine, and a number of Medical 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 rout'd; this was laid upon a Bank half a foot high, and supported round about with Planks; and upon the top was cast lit'd Earth, some two fingers deep; and then the Seed sprinkled upon it, having been steeped all night in Water mixed with Cow-dung. The Turnip seed, and the Wheat, came up half an inch above ground, within two 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 dearest, 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.
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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 Clarret Wine, other in Malmsey, other in Spirit of Wine. The proportion of the mixture was, a fourth part of the ingredients to the Water; five that there was not of the Salt above an eight 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 tawn unsteepe, but watered twice a day with warm Water; there was also other Wheat tawn 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 fix 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 itself unsteepe and unwatered, next the watered twice a day with warm Water next the Clarret 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 moff 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 carliness 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 seasons 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 its like the fame 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 comfort it sometimes with 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 (seasonably) to the Roots of Trees, doth set them forwards. But 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 succeedeth 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 loofening 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 stood at a leaf without any sign of decay or withering, more than seven days. But afterwards that Leaf faded, but the young Buds did sprout out, which afterward opened into fair Leaves, in the space of three Moneths, and continued so a while after, till upon removal we left them. 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 Springtime, 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 seemeth) Roses fete in the midst of a Pool, being supported with some flay; 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 first, 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 Beet-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 Pease, or Flowers may be accelerated in their coming and ripening, there is a double profit; the one in the high price that those things 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 seemeth 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 cautiously Latin Wheat lay under the Pan, which was somewhat moistened by the tainting of the Pan, which in six weeks (as aforefaid) looked mouldy to the eye, but it was sprouted forth half a fingers length.

It seemeth by these Instances of Water, that for nourishment the Water is almost all mall, and that the Earth doth but keep the Plant upright, and make 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 incorporate with Flesh or Roots (as in Capon-Beer, &c.) will nourish more easily than Meat and Drink taken severally.

The Houling of Plants (I conceive) will both Accelerate Germination, and bring forth Flowers and Plants in the colder Seaons: And as we House-hot Country Plants, as Lemoons, Oranges, Myrtle, to lave them; so we may Houfe our own Country Plants to forward them, and make them come in the cold Seaons, in such fort, that you may have Violets, Strawberries, Pease, 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 Houling 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 exhaled by the Sun. The Means are these. First, The cutting of 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 fed the top, (though after bearing) will, by the discharge of that, divert unto the Side-sprouts, and they will come to bear, but later.

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 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 fee 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 Gions will perish.

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

The fifth is the removing of the Tree some Moneth before it Budeth. The cause is, for that some time will be required after the Remove, for the Refecting, before it can draw the Juice; 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 restrains the Sap, and maketh it come up more slowly, 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 haintheth the Sap torise, and partly the robbing of them of Nourishment by the stuff in the Hedge;
these means may be practiced upon other both Trees, and Flowers, Murraya

Men have entertained a conceit that cheweth 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 Sions over-rule 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 speed, and more haftly 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 the Means are more proper for the one effect, and some for the other. We will handle them apart.

It is an asur’d Experience, That an heap of Flint or Stone, laid about the bottom of a wile Tree, (as in Oak, Elm, Ash, &c.) upon the first planting, doth make it proper double as much as without it. The cause is, for that it retaineth the moisture which falleth at any time upon the Tree, and suffereth it not to be exhausted by the Sun. Again, it keepeth the Tree warm from cold Blasts and Frosts, as it were in an House. It may be also, there is somewhat in the keeping of it steady at the first. Where, if lying 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 soft, it will over-moisten the Roots, so as the Worms will eat them.

A Tree at the first setting, should not be 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 both the Tree good by loosening of the Earth, and (perhaps) by exercising (as it were) and stirring the Spit 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 haftly growing Coppice wood, the way is, to take Willow, Sallow, Popler, 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, Cornelian, Mulberries, Figs.
From May to July you may take off the Bark of any Bough, being of the bigness of Three or four Inches, and cover the bare place, somewhat above and below with Loam, well tempered with Horse-dung, binding it fast down. Then cut off the Bough about Abollantide 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 doth 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 practisèd in Trees that shew fair and bear not, to bore a hole thorow the Heart of the Tree, and therupon 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 practisèd 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 least the Body of the Tree; but it will not keep open without somewhat put into it.

It is usuall practisèd to set Trees that require much Sun, upon Walls against the South; as Apricots, Peaches, Plumbs, Fives, 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 shad shuts; For when a Tree groweth 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 practisèd (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 practisèd 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 proved 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 compailling a Tree below with straw.

The lower of the Bough, where the Fruit cometh, maketh the Fruit greater, and to ripen better; for you shall ever see in Apricots, Peaches, or Mela-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 raised 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 in use, their Wines would be stronger and sweeter: But it is more chargeable in respect of the Props. It were good to try whether a Tree grafted somewhat near the ground, and the lower Boughs onely maintained, and the higher continually prouyned off, would not make a larger Fruit.

To having 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 practiced in nothing
but in Vines; which, if it were transferred unto other Trees and Shrubs, (as
Rojes, &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 commeth
any Tree, and is fit to be practiced more than it is in Fruit-trees: For
Trees cannot be so fitly 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 so dilateth it. And Gardiners use to tread down any loose
Ground after they have sown Onions, or Turnips, &c.

If *Panicum* be laid below, and about the bottom of a Root, it will cause
the Root to grow to an excessive bigness. The cause is, for that being it
felf of a pungy substance, it draweth the moisture of the Earth to it, and so
feedeth the Root. This is of great use for Onions, Turnips, Parsnips, and
Cortes.

The shifting of Ground is a means to better the Tree and Fruit; but
with this Caution, That all things do prosper bett, when they are advanced
to the better. Your Nursery of Stocks ought to be in a more barren Ground,
than the Ground is whereunto you remove them. So all Graffers prefer their
Cattle from meeker Pastures to better. We see also, that hardiers in youth
lengthen 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 hacket 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 killetb their Mols.

Shade to some Plants condueth to make them large and prosperous
more than Sun; as in Strawberries, and Bays, &c. Therefore amongst
Strawberries, sow here and there some Borrago-Seed; and you shall finde the
Strawberries under thille 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 them 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 Lush of the Earth, or of the Plant, but the saving also of
that which is spilt. So they have lately made a tryal for VVheat; which
neverthelcss hath been left off, because of the trouble and pains; yet so
much is true, that there is much saved by the Setting, in comparison of

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that which is Sown: both by keeping it from being picked up by Birds, and by avoiding the shallow lying of it, whereby much that is sown, taketh no Root.

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 feemeth to have no great probability.

It is reported, That if you take Nitre; and mingle it with VWater, to the thickness 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 Vegetables.

Take Seed or Kernels of Apples, Pears, Oranges; or a Peach, or a Plum, Stone &c. And put them into a Squill, (which is like a great Onion) and they will come up much earlier than in the Earth it self. This I conceive to be a kind 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 fame 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 several places, when it is almost at his big- nes, and before it ripeneth, hath been pratiﬁed 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 Cucumbers, and (perhaps) of other Plants, will further their growth. The venue (no doubt) hath relation to Salt, which is a great help to Fertility.

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

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

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; viz. in the end of October. For the Cold then coming upon the Seed, after it was made more tender by the warm Water, might check it.

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 moisture; 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 à Controverso, which we rejected before; for the Cions will govern. Nevertheless, it is probable enough, that if you can get a Cions to grow upon a Stock of another kind, that is much morelen 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 bater. But generally the grafting is upon a dryer Stocks; as the Apple upon a Crab, the Pear upon a Thorn, &c. Yet it is reported, that in the Low-Courts 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 set, 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 moistest 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 reft, 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 less to feed, and the less way to mount; But it may be the Fig will come somewhat later, as was formerly touched. The same may be tried likewise in other Trees.

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 Turpentine, 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.

458. 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.

459. Herbs will be tenderer, and fairer, if you take them out of Beds when they are newly come up, and remove them into Pots with better Earth. The remove from Bed to Bed was spoken of before; but that was in 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.

460. 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 onely the finer. The same Experiment may be made in Artichoaks, and other Seeds; when you would take away, either their Flashi-ness 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.

461. It is reported, That Cucumbers will be less Watry, and more Melon-like, if in the Pot 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 heat 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 Percepcion in Plants to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the Vine is far more strange: It is, that if you set a stake, or prop, some distance from it, it will grow that way, which is far stranger (as is said) than the other: For that Water may work by a Sympathy of Attraction: But this of the Stake seemeth to be a reasonable discourse.

462. It hath been touched before, that Terebration of Trees doth make them prosper better. But it is found also, that it maketh the Fruit sweeter, and better. The cause is, for that notwithstanding the Terebration, they may receive Aliment sufficient, and yet no more than they can well turn, and digest: and withal do sweare out the coursest and unprofitable Juyc, even as it is in Living Creatures: which, by moderate feeding, and exercise, and sweat, attain the soundest habit of Body.

463. 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 notto continue, as it is in Terebration, but at some Seafons. 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 Excrcement hath less Acrimony; for we see Swines and Pigs flesh is the moistest of fleshes.
It is observed by some, that all Herbs wax twenter, 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 Juicy stieth in the Root and Stalk, the better it concebeth. For one of the chief causes, why Grains. Seeds, and Fruits, are more nourishing than Leaves, is the length of time, in which they grow to Maturation. It were not amiss to keep back the Sap of Herbs, or the like, by some fit means till the end of Summer, whereby (it may be) they will be more nourishing.

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 Stocks. 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 Swine 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 Pustules 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 Pustules to speed 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 Watery 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 same is laid also of Stone out of the Quarry, to make it more durable, though that seemeth to have less reason; because the Stone lyeth not so near the Sun, as the Tree groweth.

Timber Trees in a Coppice-wood, do grow better than in an open Field; both, because they offer not tolpcd 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 Fruit; and so (no doubt) Fruit-trees, or Vines, set upon a Wall, against the Sun, between Elbows and Buttries of Stone, ripen more than upon a plain Wall.

It is said, that if Pomato Roots be set in a Pot filled with Earth, and then the Pot with Earth be set likewise within the Ground, some two or three inches, the Roots will grow greater than ordinary. The cause may be, for that having Earth enough within the Pot to nourish them; and then being stopped by the bottom of the Pot from putting its length downward, they must needs grow greater in breadth and thickness. And it may be
that all Seeds, Roots, potted, and so let 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 Eeculent, 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 Eeculent, 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, graffed upon the stocch of an ordinary Elm will put forth Leaves, almost as broad as the brim of ones Hat. And it is very likely, that as in Fruit-Trees, the Graft maketh a greater Fruit; so in Trees that bear no Fruit, it will make the greater Leaves. It would be tried therefore in Trees of that kinde chiefly; as Birch, Afe, 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 weaknesses of the Soil Seed, or Root, and the injury of the Weather) coming either of their overgrowing with Moles, or their being hide bound, or their planting too deep, or by infling of the Sap too much into the Leaves: For all these three are remedies mentioned before.

WE fee that in Living Creatures that have Male and Female, there is copulation of several kindes, 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 kindes. 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 requireth 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 doubldeth 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 flat them on the fides, and then binde 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 severall colours, upon the same Branch; and Grapes-stones of severall colours within the same Grape: But the more, after a yeare 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 cometh forth, as well as the Stock, at the least for a time.

They report, that divers seeds put into a Clout, and laid in Earth well 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 are 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 these are idle and ignorant conceits, and forfake the true indication of the causes; as the mall 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, wheresoeuer 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 nourishments are contrary, or several: But where two Plants draw (much) the same Juice, there the Neighborhood hurtheth; 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 ancienly received) to the Vine onely; but it is an enemy to any other Plant; because it draweth strongly the fattest 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 set 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 reluit sweet, the other bitter. So they have set down likewise, that a Rose set by Garlic is sweeter; which likewise may be, because the more Fetid Juice of the Earth goeth into the Garlic, and the more moderate 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 Corn.
Corn: As the blyw Bottle a kinde of yellow Mary-Gold. Wilde Poppy, and Fumitory. Neither can this be by rea sembl 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 lyce follow and unloosed, 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 meliorating of taste in Fruits, and Esculent Herbs, and of the scent of Flowers. For I do not doubt, but if the Fig-tree do make the Rew more strong and bitter, (as the Ancients have noted) good store of Rew planted about the Fig-tree, will make the Fig more sweet. Now the taftes that do most offend in Fruits, and Herbs, and Roots, are bitter, harsh, sour, and warrish, or flasty. It were good therefore to make the Tryals following.

Take Wormwood or Rew, and let it near Lettuce, or Coleflory, or Artichoak; 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 Juyce, and set them near a Vine or Fig-tree, and see whether the Grapes or Figs will not be the sweeter.

Take Cucumbers or Pumptions, 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 Raddifh, and see whether the Raddifh will notbe made the more biting.

Take Sorrel and set it amongst Raps, and see whether the Raps 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 more odorate or aromatical.

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

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

Tryal would be also made in Herbs, Poysonous, and Purgative, whose ill quality (perhaps) may be discharged or attempted, by setting stronger Poysons 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 caufe is, for 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 Juyces.

Some of the Ancients, and like wise 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 kindes: the one by opening and fluttering, and the other by bowing and inclining the Head. For Marygolds, Tulippas, Pimpernel, 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 fly, 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 it a piece of the wonder, That Garden Claver will hide the Stalk, when the Sun fiereth 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 Marygolds, Wartwoor, Mallow flowers, and others. The caufe 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 lefs 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 breadth of a finger in length. Then they make a little Cross of a Quill longways, of that part of the Quill which hath the Pith; and Cross-ways of that piece of the Quill without Pith, the whole Cross being the breadth of a finger high: Then they prick the bottom where the Pith is, and there into they put the oat-Beard, leaving half of it flicking 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 Cross sink down, but to flick: Then likewise, by way of Imposture, they make a question: As, who is the fairest Woman in the company? or who hath a Glove or Card? and cause another to name divers persons; and upon every naming, they flick the Cross in the Box, having first put it towards their Mouth, as if they charmed it, and the Cross fireth not: But when they come to the person that they would take, as they hold the Cross to their Mouth, they touch the Beard with the tip of their Tongue, and wet it, and so flick the Cross in the Box, and then you shall see it turn finely and softly, three or four turns, which is caufed by the untwining of the Beard by the moisture. You may see it more evidently if you flick the Cross between your fingers, instead of the Box: And therefore you may see, that this Motion, which is effect'd by so little wet, is stronger than the cloathing or bending of the Head of a Marygold.

It is reported by some, That the Herb called Rosa-Solis (whereof they make Strong-water) 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 Rho Solis; which they impute to a delight and sympathy that it hath with the Sun. Men favor wonders. It were good first to be sure, That the Dew that is found upon it, be not the Dew of the Morning preserved;
when the Dew of other Herbs is breathed away: For it hath a smooth and thick Leaf that doth not discharge the Dew so soon as other Herbs, that are more Spungy and Porous. And it may be purfane, 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 Gidsens Fleece of Wooll, that the Dew should fall upon that, and nowhere else.

It is certain, that the Honey-dews are found more upon Oak leaves, than upon Aeh, 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 Manua the Drug, doth fall but upon certain Herbs or Leaves onely. Flowers that have deep sockets do gather in the bottom, a kinde of Honey; as Honey-Suckles (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 Woodfate, (being like a kinde of Spittle; is found but upon certain Herbs, and those hot ones; as Lavender, Lavender-cotton, Sage, Hyfop, &c. Of the caufe of this enquire further, for it leemeth a secret. There falleth also Mifde upon Corn, and fmutteth it: But it may be, that the fame falleth also upon other Herbs, and is not observed.

It were good, Tryal were made, whether the great confent 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 Veflcl, 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 watered, then fow fome good Seeds in that Earth: But under the Canvas, fome half a foot in the bottom of the Veflcl, 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 more than this.

The Altering of the Sent, Colour, or Taste of Fruit, by Infusing, Mifling, or Letting into the Bark, or Root of the Tree, Herb, or Flower, any Coloured, Aromatical, or Medicinal Substance, are but faciles. The caufe is, for that those things have palled their period, and nourith not; and all alteration of Vegetables, in those qualities, must be by fome fhit that is apt to go into the nourishment of the Plant. But this is true; that where Kinfe feed upon Wilde Garlick, their Milk tasted plainly of the Garlick. And the Fleth of Muttons is better tasted where the Sheep feed upon Wilde Thyme, and other wholesome Herbs. Galen alfo fpeaketh of the curing of the Stinches of the Liver, by Milk of a Cow, that feedeth upon certain Herbs; and Honey in Spain fmeleth (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 Naples, (which is counted the fongett poyfon of all Vegetables) which with use, did not hurt the Maid, but poyfoned fome thathad carnal company with her. So it is obferved by fome, that there is a vertuous Befgar, and another without vertue, which appear to the fiew alike; but the vertuous is taken from the Beaf, 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; loof Meat also, (as Fish, Fowl, Milk, and Eggs) that they may be made of great use for Medicine and Diet, if the Beast, Fowl, or Fish, be fed with a special kinde of food, fit for the disease. It were a dangerous thing also for secret empoysonments. But whether it may be applied unto Plants, and Herbs, I doubt more, because the nourishment of them is a more common lyue; which is hardly capable of any special quality until the Plant do assimilate it.

But left our incredulity may prejudice any profitable operations in this kinde (especially since many of the Ancients have set them down) we think good briefly to propose the four Means, which they have devised of making Plants Medicinal. The first is by flitting of the Root, and infusing into it the Medicine, as Hellebore, Opium, Scammony, Trisyle, &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 lest 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 dugged Water, once in three or four days.
Ur Experiments we take care to be (as we have often said,) either Experiments Frutiferæ, or Luciferæ; either of Use, or of Discovery: For we hate Impostures, and despise Curiosities. Yet because we must apply ourselves somewhat to others, we will set 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 Cions upon several Boughs of a Stock, in a good ground, plentifully fed. So you may have all kinds of Cherries, and all kinds 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. This is easily performed by Moulding them, when the Fruit is young, with Moulds of Earth or Wood. So you may have Cucumbers, &c. as long as a Cane, or as round as a Sphere, or formed like a Cross. You may have also Apples in the form of 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 choke 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 con-
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ceived, that the keeping of the Sun from the Fruit, may hurt it: But there is ordinary experience of Fruit that groweth covered. Quaer 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 impressions 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.

Teneusque nos incideri Amores
Arboribus, crescenti lilla, crescentis Amore.

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, White Time, Camomil, and such like in the Earth, wherein they do but grow in the Trees, as they do in Pots, though (perhaps) with some feeding from the Trees. As it would be tried 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 same things, being too small to keep Figure; great Castles made of Trees upon Frames of Timber, with Turrets and Arches, were anciently matters of magnificence.

Among 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 neglected, and neither Watered, nor new Moulded, nor Transplanted, will turn White. And it is probable, that the White, with much culture, may turn coloured; for this is certain, That the white colour cometh of scarcity of Nourishment; except in Flowers that are onely white, and admitt 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 kinde coloured; as is found in single White Violets, White Roses, White Gilly-Flowers, White Stock-Gilly-Flowers, &c. We finde also, that Blossoms of Trees that are White, are commonly inodorate; as Cherries, Pears, Plums, whereas those of Apples, Crabs, Almonds, and Peaches, are blufthy, and smell sweet. The caufe is, for that the substance that maketh the Flower, is of the thinnest and finest of the Plant; which also maketh Flowers to be of so dainty Colours. And if it 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 scanty in their nourishment, than replenished, to have them sweet. As we see in White Sarytion, 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 smelle; 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 Radipes, in white Strawberries, in white Currans, &c. The caufe is for that the
the coloured are more juicy, and courser juiced; and therefore not so well and equally concocted, but the white are better proportioned to the digestion of the Plant.

But in Fruits, the white commonly is meaner, as in Pear-Plumbs, Damson, &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 Perdusio 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 Mulberry, the Damson-Plumb, the Peach, the Apricot, &c. Yet some Fruits which grow not to be Black, are of the Nature of Berries, sweeterst such as are paler, as the Curr-Cherry, which inclineth more to White, is sweeter than the Red; but the Eggies is more lowre.

Take Gilliflower Seed, of one kinde of Gillflowers (as of the Clove-Gillflower which is the most common) and sow it, and there will come up Gillflowers, some of one colour, and some of another, casually, as the Seed meeteth with nourishment in the Earth: So that the Gardiners finde, that they may have two or three Roots amongst an hundred that are rare, and of great price, as Purple Carnation of several Stripes. The cause is (no doubt) that in Earth, though it be contiguous, and in one Bed there are very several Juices; and as the Seed doth casually meeteth with them, so it cometh forth. And it is noted especially, that those which do come up Purple, do always come up single; the Juice, as it cometh, not being able to suffice a succulent colour, and a double Leaf. This Experiment of several colours, coming up from one Seed, would be tried also in Larks-foot, Monk-hood, Poppy, and Holly.\n
Few Fruits are coloured Red within; the Queen-Apple, 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 Eggies 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 Fruits is Green, which is a colour that no Flower is of. There is a greenish 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 Hollyes 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 Roots are Yellow, as Carrots; and some Plants, Blood-red, Stalk and Leaf, and all; as Amanthus. Some Herbs incline to Purple and Red; as a kinde of Sage doth; and a kinde of Mint, and Rosa Solis, &c. And some have White Leaves, as another kinde of Sage, and another kinde of Mint: But Azure and a fair Purple are never found in Leaves. This sheweth, that Flowers are made of a refined Juice of the Earth, and so are Fruits, but Leaves of a more course 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, by
Natural History;

by neglecting, and not removing, prove single. And the way to do it speedily, is to low for let Seeds, or Slips of Flowers; and as soon as they come up, to remove them into new ground that is good: Enquire also, whether incubating of Flowers, (as Stock-Gillflowers, Roses, Musk-Roses, &c.) doth not make them double. There is a Cherry-Tree that hath double Blossoms, but that Tree beareth no Fruits; 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 whatever maketh them so, is like to make them more tender and delicate. If a Cions or Shoot fit to be set in the Ground, have the Pith finely taken forth (and not altogether, but some of it left, the better to save the life) it will bear a Fruit with little or no Core or Stone. And the like is said to be of dividing a quick Tree down to the Ground, and taking out the Pith, and then binding it up again.

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

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 left Core or Stone.

The Rule is certain, That Plants for want of Culture, degenerate to be bolder in the same kindes; and sometimes so far, as to change into another kindes. 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.

Whosoever Fruit ueth 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 u are 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 grafted: And the rule of Exception should seem to be this, That whosoever Plant requireth much moisture, prospereth better upon the Stone or Kernel, than upon the Graft. For the Stock, though it giveth 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
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, but that Turneth into a vine, but the Oak-bough putrifying, qualifheth 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 kind: 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 puteth forth a Tree of smaller kind, that needeth less Nourishment.

There is an opinion in the Countrye, That if the same Ground be oft fown with the Grain that grew upon it, it will, in the end, grow to be of a baser kind.

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

_Grandia sapo quibus mandavimus Hordei Sulci,
Infaltx Lutum, & steriles dominatur Avena._

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 Transmutation of Species is, in the vulgar Philosophy, pronounced impossible: And certainly, it is a thing of difficulty, and requireth deep search into Nature: But seeing there appeareth 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 Caterpillers 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 expiate. So as we may well conclude, that seeing the Earth is 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 Sylvaeum_, account it strange, or think that it is an over-haste, that we have let down particulars untired: For contrariwise, 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.
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 likewise 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 Plain: so contrariwise plant Buffles, Heath, Ling, and Brakes upon a Wet or Marsh Ground. This I conceive also, that all Eusculent and Garden Herbs, set upon the tops of Hills, will prove more Medicinal, thought less Eusculent, than they were before. And it may be likewise, some Wilde Herbs you may make Salat Herbs. This is the first Rule for Transmutation of Plants.

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 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 Basil-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.

The third Rule shall be the making of some medly, or mixture of Earth, with some other Plants bruised, or shaved, either in Leaf or Root: As for example make Earth, with a mixture of Colewort Leaves flamped, and set in it Artichokes, or Parsnips: So take Earth made with Majoram, or Origanum, or Wilde Thyme, bruised, or flamped, and set in it Fenet-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.

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 send forth one kinde of Nourishment, will alter the new Seed.

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

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 it 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 town, 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 shelter 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 tenacity of Juice; 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 grated low, soon after it putteth forth, will dwarf it, and make it ipered. 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 put forth their Sap hastily, have their Bodies not proportionable to their length, and therefore they are Winders and Creepers; as Ivy, Briony, Hops, Woodbine: Whereas Dwarfing requireth a slow putting forth, and less 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 Rudiment of a Plant, and (as it were) the Mould of Earth or Bark.

Moss growth chiefly upon Ridges of Houles, tiled or thatched, and upon the Crefts of Walls, and that Moss is of a lightsome and pleasant Green. The growing upon Slopes is caused for that Moss, as on the one side it cometh of Moisture and Water, so on the other side the Water must but slide, and not stand or pool. And the growing upon Tires, or Walls, &c. is caused, for that those dried Earths, having not moisture sufficient to putt forth a Plant, do practice Germination by putting forth Moss; though when by age, or otherwise, they grow to rentent and resolve, they sometimes putt 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 ly cold, and upon the North; as in divers Taraffes. And again, if they be much trodden; or if they were at the first gravelled: For wheresoever Plants are kept down, the Earth putteth forth Moss.
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 fpatting and flattering Juice of the Earth, insufficient for Plants, doth breed Mofs.

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

Fountains have Mofs growing upon the Ground about them;

Mossy soft 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 conduceth to the same.

The Moss of Trees, is a kinde of Hair; for it is the Juice of the Tree, that is exceded, and doth not assimilate, and upon great Trees the Mofs gathereth a figure, like a Leaf.

The moisture for Trees yield little Mofs, as we see in Alfs, 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 Barkes of those Trees are more close and smooth, than those of Oaks, and Ashes, whereby the Mofs can the harder infiltrate out.

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

We have said heretofore, that if Trees be hide-bound, they wax less fruitful and gather Mosses; 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 Mosses: 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 plowing, it will not gather more Mosses. I think also, the Watering of Trees with cold Fountain Water will make them grow full of Mosses.

There is a Moss the Perfumers have, which cometh out of Apple-Trees, that hath an excellent fent. Quere, particularly for the manner of the growth, and the nature of it. And for this Experiments make, being a thing of price, I have set down the last Experiments, how to multiply and call on Mosses.

Next unto Moss, I will speak of 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 unlow. And therefore such as are Uplifted 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 accident, which we call Incubus, or the Mhare in the Stomach. And therefore the Sufferers of them may suffocate and empoison. And this fetheth, that they are windy; and that windines is gros, and swelling, not sharp or griping. And upon the same reason Mushromes are a venefious Meat.
It is reported, that the Bark of white or red Poplar, (which are of the moistest of Trees) cut small, and cast into Furrows well dunged, will cause the ground to put forth Muskromes, at all seasons of the year it to be eaten, some add to the mixture Leave 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 feafton, it will put forth great store of Muskromes.

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

It hath been reported, though it be scarce credible, that Ivy hath grown out of a Stags-Horn; which they suppose did rather come from a conflagration of the Horn upon the Ivy, than from the Horn itself. There is not known any substance, but Earth, and the Procedens of Earth, (as Tile-Stone, &c.) that yeildeth any Mols, 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 shew) is like a great Muskromes: And it is sometimes as broad as one Har, which they call a Tennis-Ball; but it is not Edulent, and it groweth (commonly) by a dead Stub of a Tree, and like wife about the Roots of rotten Trees; and therefore seemeth to take his Juice from Wood purified. Which sheweth by the way, that Wood purified yieldeth a frank moisture.

There is a Cake that groweth upon the side of a dead Tree, that hath gotten no name, but it is large and of a Cheffnut 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 groweth commonly in the Fields; that at first is hard like a Tennis-Ball, and white; and after growth of a Muskromes 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 Kibles. Belike it hath a Corrofive, and fretting Nature.

There is an Herb called Jewell-Ear, that groweth 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 sanguinaries, and inflammations in the Throat, whereby it seemeth to have a mollifying, and lenifying vertue.

There is a kind of Spongy excrescence, which groweth chiefly upon the Roots of the Laffer-Tree, and sometimes upon Cedar, and other Trees. It is very white, and light, and friable; which we call Whistle. It is famous in Physick for the purging of tough Plegm. And it is also a very 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 Miffelteor. They have an idle Tradition, that there is a Bird called a Miffel-Bird, that feedeth upon a Seed, which many times she cannot digest, and to expellet it whole with her Excrement; which falling upon a Bough of a Tree, that hath some rite, putteeth forth Miffelteor. But this is a Fable; for it is not probable, that Birds should feed upon that they cannot digest. But allow that,
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-Boughs, 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 falteeth upon the Bough. Mistletoe growth chiefly upon Crab-trees, Apples-trees, sometimes upon Hollies, and rarely upon Oakes; 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 growth. Two things therefore may be certainly set down: First, that Superfaturation must be by abundance of Sap, in the Bough that putteth it forth. Secondly, that that Sap must be such as the Tree doth excrete, and cannot assimilate, for else it would go into a Bough; and besides, it seemeth to be more far and unjuicious, 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 dunned, to see if it would bring forth Mistletoe, or any such like 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 shall 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 Ciont, being turnet down into Clay. Therefore in this Experiment also, the Tree would be closed with somewhat that is not so natural to the Plant 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 Bake hath been known to grow out of a Pollard.

A Man may count the Prickles of Trees be to a kind of Excrecence, for they will never be Boughs, nor bear Leaves. The Plants that have Prickles, are Thorns, Black and White; Briers, Rose, Lemon-trees, Crab-trees, Gooseberry, Berberry; these have it in the Bough. The Plants that have Prickles in the Leaf are, Holly, Juniper, Whin bush, Thistle; Nettles also have a small venemous Prickle; to hath Borage, but harmless. The cause must be, haftly putting forth, want of moisture, and the clostens of the Bark: For the haste of the Spirit to put forth, and the want of nourishment to put forth a Bough, and the clostens of the Bark, cause Prickles in Boughs; and therefore they are even like a Pyramid, for that the moisture spendeth after a little putting forth. And for Prickles in Leaves, they come alo of putting forth more Juice in the Leaf, that can speed in the Leaf smooth; and therefore the Leaves other wise are rough, as Borage 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-Gillflowers, Celer-foot; which Down or Nap cometh of a subtile Spirit, in a soft or far substance. For it is certain, that both Stock-Gillflowers, and Rose-Campions,
Campions, stamped, have been applied (with success) to the Wreaths of those that have had Terris or Quartan agues; and the Vapor or Coltis-foot have a sanaative virtue towards the Lungs, and the Leaf also is healing in Surgery.

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

There is also upon Sweet, or other Bryer, a fine Tuft, or Brush 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 Ponds and Houses and bottoms of Wells, and then put into Pots, will put forth sundry kind 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 loof and fine, it putth forth soft Herbs; as Grass, Plantain, and the like: If the Earth be harder and courser, it putth forth Herbs more rough, as Thistles, Firs, &c.

It is common Experience, that where Alleys are close gravelled, the Earth putth 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 loofened at the top, the ordinary Grass cometh up.

It is reported, that Earth being taken out of shady and warty Woods, some depth, and potted, will put forth Herbs of a fat and juicy substance; as Penny-wort, Purslane, Houseleek, Penny Royal, &c.

The Water also doth send forth Plants that have no Roots fixed in the bottom; but they are not perfect Plants being almost but Leaves, and thole 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 putth 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 Sea isireth little. As for the Alga Marina, (Sea-weed) and Feringium (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 putrid: and that they are all bitter, and they name one especially, Fennus, which we call Mash-Mellem. It is certain, that Worms are found in Snow commonly, like Earth-worms; and therefore it is not unlike, that it may likewise put forth Plants.
570. 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 Mosses 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 Aylses have been seen to grow out of Steeples: but they manifestly grow out of Clefts, in so much as, when they grow big, they will disjoin 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.

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

572. The Sea-finds seldom bear Plants. Whereof the cause is yielded by some of the Ancients, for that the Sun exhaleth 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.

573. 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 Experiment 29.

574. 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, contused together, and mingled with other Earth, and well watered with warm Water, there came forth Herbs much like the other.

575. Plants, brought out of hot Countreys, will endeavor to put forth at the same time, that they 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 verge of the Seed is not worn out, whereas in a Tree, it is embased by the Ground, to which it is removed.

576. 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 Orange, and Lemon Seeds, &c. The Seeds whereof, sown in the end of April, will bring forth excellent Sallets, mingled with other Herbs. And I doubt not, but the Seeds of Clove-Trees, and Pepper-Seeds, &c. If they could come hither Green enough to be sown, would do the like.
There 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, Primrose, Violets, Anemones, Water-Daffodils, Crocus Vernus, and some early Tulipas. 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, Flower-deluces, &c. And the latest are, Gilly-flowers, Holly-Oaks, Larks-Foot, &c. The earliest Blossoms are, the Blossoms of Peaches, Almonds, Cornelians, Mezerions, &c. And they are of such Trees, as have much moisture, either Watery, or Oily. And therefore Crocus Vernus also, being an 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 used for Horsemeat, are ripe last; and it seemeth, that the latter Grain cometh first. The earliest Fruits are, Strawberries, Cherries, Gooseberries, Corrans; and after them early Apples, early Pears, Apricots, Raspis; and after them, Damsons, and many kinds of Plumbs, Peaches, &c. And the latest are, Apples, Wardens, Grapes, Nuts, Quinces, Almonds, Sloes, Brier-berrys, Heps, Medlars, Servises, Cornelians, &c.

It is to be noted, that (commonly) Trees that ripen last, blossom soonest; as Peaches, Cornelians, Sloes, 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 come not up till late Spring, yet their Harvest is as early as ours. The cause is, for that the strength of the Ground is kept in with the Snow; and we see with us, that if it be a long Winter, it is commonly a more plentiful year. And after those kinds 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 come 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 soonest.

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

Some
Some Herbs are but Annual, and die Root and all once a year; as Borage, Lettuce, Cucumbers, Musk-Melons, Bajf, Tobacco, Mustard-seed, and all kinds 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 Borage, Lettuce, Cucumbers, Corn, &c. And therefore none of these have (all) much heat.

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

Trees that bear Maft and Nuts, are commonly more lasting than those that bear Fruits, especially the moister Fruits; as Oaks, Beeches, Cheesnuts, Walnuts, Almonds, Pine trees, &c. laft longer than Apples, Pears, Plumbs, &c. The cause is, the fattrnts, and oylines of the Sap; which ever wasteth lef, than the more Watry.

Trees that bring forth their Leaves late in the year, and call them likewise late, are more lasting than those that sprout their leaves early, or shed them betimes. The cause is, for that the late coming forth, letteth a moisture more fixed; and the other looke, and more easily resolved. And the same cause is, that wilde Trees laft longer than Garden-trees; and in the same kinde, those whose Fruit is acide more than those whose Fruit is sweeter.

Nothing procureth the lasting of Trees, Bulches, and Herbs, so much as often cutting; 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 reasonably, 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 touched; such as is Lettuce, Purslane, Cucumber, and the like. And for great Trees, we see almost all overgrown Trees in Church-yards, or near ancient Building, and the like, are Pollards or Dottards, and not Trees at their full height.

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. laft a whole year. You must ever preferpepe, that you handle it fo, 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 laft longer time: It were good to try it in a Stalk of Wheat, &c. let in the thade, and encompassed with a cazo 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 Kinde and Bark, breaketh not forth at all. (as in the Bodys of Trees, and Stalks of Herbs,) till they begin to branch, and then, when they make an eruption, they break forth calually, where they finde best way in the Bark or Kinde. It is true, that some Trees are more scattered in their Boughs: as Sallow trees, Warden-trees, Quince-trees, Medlar-trees, Lemon-trees, &c. Some are more in the form of a Pyramis, and come almost to top; as the Pear-trees (which the Cists will have to borrow his name of Fire) Orange-trees, Fir-trees, Service-trees, Lime-trees, &c. And some are more spread and broad, as Beeches, Hornbeam, &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 spending of it, when it beginneth to branch, by equal degrees: The spreading is caused, 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 Joynts, or Knuckles, as it were stops in their Germination; as have Gilliflowers, Pinks, Fennel, Corn, Reeds, and Canes. The caufe 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 cleftens and hardnes in their Stalk, which hindereth the Sap from going up, until it hath gathered into a knot, and 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, Bryer-Roses, single Muske-Roses, single Pinks, and Gilliflowers, &c. which have five Leaves; Lilies, Flower-de-luces, Boughs, Bungals &c. which have four Leaves. But some put forth Leaves not numbered, but they are ever small ones; as Margolds, Trifole, &c. We see also, that the Sockets, and Supporters of Flowers, are Figure; 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, Cornelians, Black-Thorn, &c. But most put forth some Leaves before their Blossoms; as Apples, Pears, Plums, Cherry, White-Thorn, &c. The cause is for that those 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 Joyce, 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, Ferr, Elggh, Cypress, Juniper, Bays, Rosemary, &c. The cause of the holding Green, is the close and compact substance.
flance of their Leaves, and the Pedicles of them. And the cinne of that again, is, either the tough and viscous Joycee of the Plant, or the Strenght and heav thereof. Of the first fort, is Holly: which is of so viscous a Joycee, as they make Birdlime of the Bark of it. The Stallk of Ivy is tough, and not fragile, as we see it in other small Twigs dry. Fritt yieldeth Hitch. Box is a tall and heavy Wood, as we see it in Bowls. Eph 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 so is Rosemary for a Shrub. As to 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 trial would be made of Grafting of Rosemary, and Bays, and Box, upon a Holly Stock, because they are Plants that come all Winter. It would good to try it also with Graflts of other Trees, either Fruit trees, or Wild-trees, to see 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 most in the Winter. It may be also a Mezerion-tree grafted upon a Holly, will prove both an earlier, and a greater Tree.

There be some Plants that bear no Flower, and yet bear Fruit; there be some that bear Flowers, and no Fruit; there be some that bear neither Flowers nor Fruit. Most of the great Timber-trees, (as Oaks, Beeches, &c.) bear no apparent Flowers; some few (likewise) of the Fruit-trees, as Mul-berry, 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 Purlane, &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 trial 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 be some Plants that shooet still upwards, and can support them-selves, 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, Climatis, 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 flender Stall, which will not support the weight; and therefore these latter fort are all swift and halty comes.

The first and most ordinary help is Stercoration. The Sheeps-dung is one of the best; and next, the Dung of Kine; and thirdly, that of Horses; which is held to be somewhat too hot, 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 spred it immediately before the Ploughing and Sowing, and lo to Plough it in: For if you spred it long before, the Sun will draw out much of the fames of the Dung. If the Ground be Grazing Ground, to spred it somewhat late towards Winter, that the Sun may have theles power to dry it up. As for special Composts for Gardens (as a Hot Bed, &c.) we have handled them before.

The second kinde of Compost is, the spreding 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 best, as having most fames. 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-heateath the Ground a little; and therefore is beat 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 Gras as well as Corn. But that which breedeth 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 Gras; 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 compasseth it self; for I knew a great Garden, that had a Field (in a manner) poured upon it, and it did bear Fruit excellently the first year of the Planting; for the Surface of the Earth is ever the fruitfullest: And Earth 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 plach the Ground over, it will breed Salt-Peter. As for Pond-earth or River-earth, it is a very good comfost, 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; insomuch as the Countrymen about Etna and Vesuvius have a kind of amends made them, for the mischief the eruptions (many times) do, by the exceeding fruitfulness of the soyl, caufed by the Alhes scattered about. Soot also, though thin, spread in a Field or Garden, is tried to be a very good compost. For Salt it is too costly; but it is tried, that mingled with Seed-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 keeping of the Seeds in several mixtures with Water, to give them vigor, or wetting Grounds with Compost-water, we have spoked of them before.

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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 Compost: For there is nothing lost, so much as Leaves of Trees, and as they lie scattered, and without mixture, they rather make the Ground 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 Inclinations, mendeth Ground; we see also, that lying open to the South, mendeth Ground; we see again that the Foldings of Sheep help Ground as well by their warmth, as by their compost: And it may be doubted, whether the covering of the Ground with Brakes, in the beginning of the Winter (whereof we spake in the last Experiment) helpeth it not, by reason of the Warmth. Nay, some very good...
Husbands 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 seasonable times; for Water, at some seasons, and with reasonable stay, doth good; but at some other seasons, and with too long stay, doth hurt. And this serveth only for Meadows, which are along some River. The other way is to bring Water from some hanging Grounds, where there are Springs into the lower Grounds, carrying it in some long Furrows; and from thosc 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 washeth 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.
He differences between *Animate* and *Inanimate Bodies*, we shall handle fully under the Title of *Life*, and *Living Spirits*, and *Powers*. We shall therefore make but a brief mention of them in this place. The main differences are two. All Bodies have Spirits, and 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 Tangible parts; and are not pervious one to another, as Air is in Snow. The second main difference is, that the Spirits of Animate Bodies are all in some degree (more or less) kindled and inflamed; and have a fine commixture of Flame, and an Aerious 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 *Clove* and other Spices, *Napha* and *Petroleum*, have exceeding hot Spirits (hotter a great deal than *Oil*, *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 itself, 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 kind, which is not in Bodies inanimate.
Natural History;

The differences between plants and Metals, or Fossiles besides those four beforementioned, (for Metals I hold innimate) are these: First, Metals are more durable than Plants: Secondly, they are more solid and hard; Thirdly, they are wholly subterrany; whereas Plants are part above Earth, and part under Earth.

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

Another special Affinity is between Plants and Mould, or Putrefaction: For all Putrefaction, (if it disolve not in Arefaction) will in the end issue into Plants or Living Creatures bred of Putrefaction. I account Mois, and Muhrrowes, and Agarics, and other of those kinds, to be but Moulds of the Ground, Walls, and Trees, and the like. As for Flesh, and Fish, and Plants themselves, and a number of other things, after a Moonline, or Rotundit, or Corputing, they will fall to breed Worms. These Putrefactions, which have Affinity with Plants, have this difference from them; that they have no succission or propagation, though they nourish, and have a period of Life, and have likewise some Figure.

I left one, by chance, a Cistron cut in a close room, for three Summer-months, that I was absent; and at my return, there were grown forthout of the Fish cut, Tüfs of Hairs, an inch long, with little black Heads as if they would have been some 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 invertere. 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 Sense, 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, (as they report) if they grow near, incline the one to the other; in the same (which is more strange) they doubt not to report, that to keep the Trees upright from bending, they dye 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 simplified. Nevertheless, I
am apt enough to think, that this time Binaria of a stronger and a weaker, like unto Masculine and Feminine, doth hold in all Living Bodies. It is confounded sometimes, as in some Creatures of Putrefaction, wherein no marks of distinction appear; and it is doubled sometimes, as in Hermaphrodites: but generally there is a degree of strength in most Species.

The Participles or Confiners between Plants and Living Creatures, are such chiefly as are fixed, and have not Local Motion of remove; though they have a Motion in their parts, such as are Oylfors, Cockles, and such like, there is a fabulous Narration, That in the Northern Countries there should be an Herb that groweth in the likeness of a Lamb, and feedeth upon the Grass, in such sort, as it will bear the Grass round about. But, I suppose, that the Figure maketh the Fable; for so we see there be Bee-flowers, &c. And as for the Grass, it seemeth the Plant, having a great talk 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 to 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 talk, which maketh the Bough, being over-loaded, 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 aflateth the Fruit; which nevertheless is of a pleasant tate. And that (no doubt) is caused, by the suppleness and gentleness 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 tate, groweth out of the Bark. It may be, there be Plants that pour out the Sap to 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 comparision. The Fig hath the greatest, and next it the Pine, Mulberry, and Sycamore, and the least are those of the Willow, Birch, and Thorn. But there be found Herbs with far greater Leaves than any Tree; as the Bar, Gourd, Cucumber, and Coleworts. The cause is, (like to that of the Indian Fig) the hafty and plentiful putting forth of the Sap.

There be three things in ume for sweetnens, 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 Cane 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 Ochus, in the Valleys of Persia, that distilleth Honey in the Mornings. It is not unlike, that the Sap and Tears of some Trees may be sweet. It may be also, that some sweet Juices, fit for many umes, may be concocted out of Fruits, to the thicknes of Honey, or perhaps of Sugar; the likeliest are Raisins of the Sun, Figs, and Corrans: The Means may be enquired.

The Ancients report of a Tree, by the Persian Sea, upon the Shore-sands, which
which is nourished with the Salt-water; and when the tide ebbs, you shall see the Roots, as it were, bare without Bark (being, as it seemeth, corroded by the Salt) and graping the Sands like a Crab, which nevertheless beareth a Fruit. It was good to try some hard Trees, as a Service-Tree or Fir-Tree, by setting them within the Sands.

614. There be of Plants which they use for Garments, thefe that follow, Hemp, Flax, Cotton, Nettle, (whereof they make Nettle Cloth) Sericum, which is a growing Silk; they make alfo Cables of the Bark of Lime-Trees. It is the Silk that maketh the Flax matter commonly, and sometimes the Down that groweth above.

615. They have in some Countreys, a Plant of a Rose-colour, which flufeth in the Night, openeth in the Morning, and openeth wide at Noon; which the Inhabitants of those Countreys say, is a Plant that sleepeith. There be Sleepers enough then; for almost all Flowers do the like.

616. 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 Impoftors make an ugly Image, giving it the form of a face at the top of the Root, and leave those Strings to make a broad Beard down to the foot. Also there is a kind of Nandin Tree (being a kind of Fyn) 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 Hairy Roots. And, I take it, in the Bulbous, the Sap that went in to the Air and Sun: In the Fibrous, the Sap deligheth more in the Earth, and therefore putteth downward: and the Viffer is a middle between both, that besides the putting forth upwards and downwards, putteth forth in round.

617. There are some Tears of Trees which are kenned from the Beards of Goats; for when the Goats bite and crop them, especially in the Mornings, the Dew being on the Tear couseth forth, and hangeth upon their Beards: Of this sort is some kind of Ladanum.

618. The Irrigation of the Plane-tree by Wine, is reported by the Ancients, to make it fruitful. It would be tried likewise with Roots; for upon Seeds it worketh no great effect.

619. The Way to carry Foreign Roots: a long way, is to velfl them close in Earthen veflcls; but if the Veflcls be not very great, you must make some holes in the bottom, to give some reflemement to the Roots; which otherwife (as it seemeth) will decay, and fuffocate.

620. 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 fertile; for in flowers it proflifed worst: It grew also amongst Bulfes of other kindes, where commonly Plants do not thrive, neither did it love the Sun. There might be one caufe of all those effects, namely, the fparing nourifhment, which that Plant required. Quere, how far Cassia, which is now the fubftitute of Cinnamon, doth pafpartake of these things.

621. It is reported by one of the Ancients, that Cassia, when it is gathered, is put into the Skins of Beasts newly flayed; and that the Skins corrupting, and breeding 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.

622. There were in ancient time, Vines of far greater Bodies, then we know any; for there have been Cups made of them, and an Image of Jupiter. But it is like they were wild Vines; for the Vines that they use for Wine, are (so often
Grapes, which are very and for Such Of trcam but and for but and for such is reported, That in some places, Vines are suffered to grow like Herbs Species upon the Ground, and that the Grapes of those Vines are very great. It were good to make trial, whether Plants that use to be born up by props, will put forth greater Leaves, and greater Fruits if they be laid along the Ground; as Hops, 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 taste over-lushious, it were good to make trial in Powder of Sugar, or in Syrup of Wine only boiled to height. Both these 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 set 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, Purflane, Tarragon, Cretes, Cucumbers, Musk-Melons, Radish, &c. Others only after they are boiled, or have passed the Fire; as Parsley, Clary, Sage, Parsnips, Turnips, Alasragus, Artichokes, (though they also being young are eaten raw.) But a number of Herbs are not efficent at all; as Wormwood, Gras, Green-Corn, Centory, Hyslape, Lavender, Balm, &c. The causes are, for that the Herbs that are not efficent, do want the two taffes, in which nourishment refleth; which are fat and sweet, and have (contrariwise) bitter and over-strong taffes, or a juice too crude, as cannot be ripened to the degree of Nourishment, Herbs, and Plants, that are Efficent raw, have fatness, or sweetines, (as all Efficent Fruits) such are Onions, Lettuce, &c. But then it must be such a fatness (for as for sweet things, they are in effect always efficent) as is not over-gros, as loading of the Stomack; for Parsnips and Leeks have fatness; but it is too gros and heavy without boiling. It must be also in a substance somewhat tender, for we see Wheat, Barley, Artichokes, are no good Nourishment, till they have passed the Fire; but the Fire doth ripen, and make them soft and tender, and so they become efficent. As for Radish, and Tarragon, and the like, they are for Condiments, and not for Nourishment; and even some of those Herbs, which are
Not esculent, are not withstanding poculent; as Hops, Broom, &c. Quare, what Herbs are good for Drink, besides the two aforesaid; for that it may (perhaps) sake 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 Oily, and Watry substance commixed) have more of the Oily substance, 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 cause is, for that in Plants that are not of a fierce and eager spirit, the vertue is increas'd by Concoction and Maturation, which is ever most in the Seed; but in Plants that are of a fierce and eager spirit, they are stronger whilst the spirit is inclosed in the Root; and the spirits do but weaken and dissipate, when they come to the Air and Sun; as we see in Onions, Carlick, Dragon &c. Nay, there be Plants that have their Roots very hot and aromatical, and their Seeds rather infipid as Ginger. The cause is (as was touched before) for that the heat of those Plants is very diffizable; 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 Oily. I reckon amongst the Watry, all the Fruits, out of which, Drink is express'd; as the Grape, the Apple, the Pear, the Cherry, the Pomegranate, &c. And there are some others, which though they be not in use for Drink, yet they appear to be of the same nature; as Plums, Services Mulberries, Rais's, Oranges, Lemmons, &c. And for those Juices that are so fishy, as they cannot make Drink by Expression, yet perhaps) they may make Drink by mixture of Water.

Poulaque admittit imitansur vitae Sorbit.

And it may be Heps and Brier-Berries would do the like. Those that have Oily Juices, are Olives, Almonds, Nuts of all forts, 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 sharpness or oylines; such as is the Fig and the Date.

It hath been noted, that most Trees and especially those that bear Moss, are fruitful but once in two years. The cause, no doubt, is the expence of Sap; for many Orchard Trees well cultured, will bear divers years together.

There is no Tree, which besides the Natural Fruit, doth bear so many Bastard Fruits as the Oak doth; for besides the Acorn, it beareth Galls, Oak-Apples, and certain Oak-Nuts, which are inflammable; and certain Oak-Berrieslicking close to the Body of the Tree without Stalk. It beareth also Mistletoe, though rarely. The cause of all these may be, the closeness, and solidines of the Wood, and Pith 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 are two Excrences 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 *Mycetinum*, that is called *Agaric* (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 Excrences of Trees grow chiefly, where the Tree is dead, or faded; for that the Natural Sap of the Tree, corrupteth into some natural substance.

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. Thofe that bear best below, are such, as shade doth more good to than hurt: For generally all Fruits bear best below, because the Sap upreth, not having but a short way. And therefore in Fruits sired upon Walls, the lowest are the greafteft, as was formerly said: So it is, the shade that hindreth the lower Boughs, except it be in fuch Trees as delight in shade, or at least bear it well. And therefore they are either ftrong Trees, as the Oak, or else they have large Leaves, as the *Walnut* and Fig, or else they grow in *Pyramis* as the *Pear*. But if they require very much Sun, they bear best on the top; as it is Crabs, *Apples*, Plumbs, &c.

There be Trees that bear best when they begin to be old; as Almonds, *Pears*, *Vines*, and all Trees that give *Maff*. The caufe is, for that all Trees that bear Maff have an oily Fruit; and young Trees have a more witty Juice, and lets concocted; and of the fame kindle also is the *Almond*. The *Pear* likewife though it be not oily, yet it requireth much Sap, and well concocted; for we fee it is a heavy Fruit, and solid, much more than Apples, Plumbs, &c. As for the *Vine*, it is noted that 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 fee, that *Wine* is inflamable, so as it hath a kind of oiliness. But the most part of Trees, among 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-thiftles*, *Spurge*, &c. The caufe may be an Inception of Putrefaction: For ftofe Milk 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 fheweth, that it is a sharp or fretting *Juice*. Lettuce is thought poyfonous, when it is too old; as to have *Milk*: *Spurge* is a kind of poyfon in itfelf; and as for *Sow-thiftles*, though *Coney* eat them, yet *Sheep* and *Carret* will not touch them; and besides, the Milk of them, rubbed upon *Warts*, in short time wear them away: Which fheweth the Milk of them to be *Corrosive*. We fee alfo, that *Wheat* and other *Corn* toun, if you take them forth of the Ground, before they sprout, are full of Milk; and the beginning of *Germination* is ever a kind of Putrefaction of the Seed. *Euphorbiun* alfo 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 cleaneth the *Eyes*; it is good alfo for *Carataces*.

*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 caufe is, for that *Strong Trees* are towards such Excrences in the nature of Earth, and therefore put forth *Mofs*, *Mushromes*, and the like.
Natural History

There is hardly found a tree that yieldeth a red juice in the Blade or Ear, except it be the Tree that beareth Sanguis Draconis; which groweth chiefly in the Island Soguara: The Herb Arumanthum (indeed) is red all over; and Balsam is red in the Wood, and so is Red Sanders. The Tree of Sanguis Draconis growtheth in the form of a Sugar-Loaf; it is like the Sap of that Planta concocteth in the Body of the Tree. For we see, that Grapes and Pomegranates are red in the Juice, but are Green in the Tear. And this maketh the Tree of Sanguis Draconis after towards the top, because the Juice hath not up; and besides, it is very Astringent, and therefore of slow motion.

It is reported, that Sweet Moses, besides that upon the Apple-trees, groweth likewise (sometimes) upon Poplars, and yet (generally) the Poplar is a smooth Tree of Bark, and hath little Moses. The Moses of the Larix-tree burneth also sweet, and sparkleth in the burning. Quere, 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 Ape, that Cleopatra used, hath some affinity with it. The cause is, for that the tormentors of Death are chiefly railed by the style of the Spirits; and these Vapors quench the Spirits by degrees; like to the death of an extreme child: 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; to Fennel-seeds are sweet before they ripen, and after grow spicy; and some never ripen to be sweet; as Tamarinds, Barberries, Crabs, Shes, &c. The cause is, for that the former kind have much and subtle heat, which causeth early sweetness; the latter have a cold and acide Juice, which no heat of the Sun can sweeten. But as for the Mirabolans, 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 these high tastes may happen to be (sometimes) in the humors, but are seldom in the flesh, or substance; 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, Sampbere, Scurny Grass, &c. And they report there is in some of the Indian Seas, a Swimming Plant, which they call Salges, spreading over the Sea, in soe, 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 Linca, which is full of Prickles: This Herb putteth forth another small Herb out of the Leaf, which is imputed to some moisture, that is gathered between the Prickles, which putrified by the Sun, 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 Malt) being steeped in Water three days, and afterwards the Water drained from it, and the Barley turned upon a dry Flour, 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 Oropin and Semper-vire; 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 Roses, that they will come far fatter on in Water then in Earth; for the nourishment is earlier drawn out of Water then out of Earth. It may give some light also, that Drink infused with Fleth, as that with the Copan, &c. will nourish fatter and earliuer, then Meat 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 Dust besides the Malt, which I suppose to be, not only 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 Dulcoration of things is worthy to be tried to the full; for that Dulcoration imparteth 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 cast 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 kind of curling is roughness, as in Clary and Bur. 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 putrefied, 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, &c. Some spread more towards the Surface of the Earth; as the Ash, Cypres-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 legs. And the same reason, under Ground, to avoid recefs from the Sun, maketh them spread the more. And we see it cometh to pafs 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
the Olive is full of Oily Juyce, and Asf 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 Pines, and Firr likewise, they have fo much heat in themselves, as they need les the heat of the Sun. There be Herbs also, that have the fame difference, as the Herb they call Atosius Diaboli, which putteth the Root down to low, as you cannot pull it up without breaking; which gave occasion to the name and fable, for that it was faid it was fo wholesome a Root, That the Devil when it was gathered, bit it for envy. And some of the Ancients do report, that there was a goodly Firr (which they defired 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 set with the Bark on, they would not grow; yet contrariwise we fee, 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 alone.

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 clusters some of the Stock.

The Reed or Cane is a warry Plant, and groweth not but in the Water. It hath these properties, That it is hollow, that it is knuckled, both Stalk and Root, that being dry it is more hard and fragile then other Wood, that it putteth forth no Boughs, though many Stalks out of one Root. It differeth 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 Calis Filius, and the Sugar-Reed. Of all Plants it boweth the easieth, and rifeh 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 warie 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 Juices in their Fruit, have commonly the moistest Sap in their Body; for the Vines and Pears are very moist; Apples somewhat more spongy: the Milk of the Fig hath the quality of the Rennet, to gather Cheese, and so have certain four Herbs wherewith they make Cheese 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 Chamoloted; as Oak, whereof Wainscrot is made; Maple, whereof Trenchers are made: Some more smooth, as Firr andWalnut; some do more easily breed Worms and Spiders; some more hardly, as it is said of Irish Trees. Besides, there be a number of differences.
differences that concern their use: As Oak, Cedar, and Chesnut, are the best builders. Some are best for Plough-timber, as Ash; some for Pears, that are sometimes wet and sometimes dry, as Elm; some for Planchers, as Deal; some for Tables, Cupboards and Desks, as Walnuts; some for Ship-timber, as Oaks that grow in moist Grounds, for that maketh the Timber rough, and not apt to rot with Ordnance, wherein English and Irish Timber are thought to excel) some for Masts 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 calcul’d: 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 moist Fruit-trees; Sampire groweth but upon Rocks; Reeds and Oliers 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 wild Thyme sheweth good Feeding Ground for Cattle; Betony and Strawberries shew Grounds fit for Wood; Camomile sheweth meadow Grounds fit for Wheat; Mustard-feed growing after the Plough, sheweth a good strong Ground also for Wheat; Burnet sheweth good Meadow, and the like.

There are found in divers Countreys, some other Plants that grow out of Trees and Plants, besides Mistletoe: As in Syria there is an Herb called Caffius, that groweth out of tall Trees, and windeth it self about the same Tree where it groweth, and sometimes about Thorns. There is a kind of Polypode that groweth out of Trees, though it windeth not. So likewise an Herb called Pannor upon the Wilde Olive; and an Herb called Hippophaest upon the Fullers Thorn, which, they say, is good for the Falling-ficknes.

It hath been observed by some of the Ancients, that howsoever cold and Bitterly 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, inasmuch, 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 overspenth 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 as out of the Teat: 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 goodness, for the best Wines are in the dryest Vintages.
Natural History.

Small flowers are likewise good for Corn, to as parching heals come not upon them. Generally, Night-showers are better than Day showers; 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 showers doth easily soften, is commended; and yet some Earth of that kind will be very dry and hard before the showers. The Earth that causeth up from the Plough a great clod, is not to good as that which causeth up a smaller clod. The Earth that putteth forth Mist, easily, and may be called Mouldy, is not good. The Earth that finely well upon the Digging, or Ploughing, is commended; as containing the Juicy of Vegetables almost already prepared. It is thought by some, that the ends of low Run-bows fall more upon one kind of Earth then upon another: As it may well be, for that Earth is most toxicide; and therefore it is commended for a sign of a good Earth. The poorness of the Herbs (it is plain); the with the poorer of the Earth, and especially, if they be in colour more dark: But if the Herbs shew withered or blasted at the top, it sheweth the Earth to be very cold; and so doth the Molleres 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 shallow Earth is the best; being more 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 clearing, and full of Juice.

It is strange, which is observed by some of the Ancients, that Dull helps the fruitfulnes of Trees, and of Vines by name; insomuch, as they call Dull upon them of purpose. It should seem that that powdring, when a shower cometh, maketh a kind of foysting to the Tree, being Earth and Water finely laid on. And they note, that Countreys 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 Staks and Leaves of Lupines about the Roots, or to Plough them into the Ground, where you will sow Corn. The burning all of the cuttings of Vines, and casting them upon Land, doth much good. And it was generally received of old, that dunng of Grounds when the 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 not now in use. The Ancients had it, and that three ways; the first was Injision, which is the ordinary manner of Grafting: The second was Teresation, through the middle of the Stock, and putting in the Gions there; And the third was Paring of two Vines that grew 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 closeness of Air; and therefore in Hills, or large Champain Grounds, it seldom cometh; such as is with us York's Want. This cannot be remedied, otherwise then that in Countreys of small encloasure the Grounds be turned into larger Fields: Which I have known to do good in some Farms.
Another Disease is the putting forth of Wilde Oats, whereinto Corn oftentimes (especially Barley) doth degenerate. It happeneth chiefly from the weakness of the Grain that is sown: for if it be either too old or mouldy, it will bring forth wilde Oats. Another disease is the scarcity of the Ground; for if you sow one Ground still with the same Corn (I mean not the same Corn that grew upon the same Ground, but the same kinde of Grain, as Wheat, Barley, &c.) it will prosper but poorly; therefore be sides the fertility of the Ground, you must vary the Seed. Another ill Accident is from the Winds, which hurt at two times; at the flowering by shaking of the Flowers, and at the full ripening by shaking out the Corn. Another ill Accident is Drought at the spindling of the Corn, which with us is rare, but in hotter Countreys common, insomuch as the word Calamus was first derived from Calamus, when the Corn could not get out of the stalk. Another ill Accident is Over-wet at sowing time, which with us breedeth much Dearth, insomuch 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 better Frosts, continued without Snow, especially in the beginning of the Winter, after the Seed is new sown. Another Disease is Worms, which sometimes breed in the Root, and happen upon hot Suns and showers immediately after the sowing; and another Worm breedeth in the Bar it self, especially when hot Suns break often out of Clouds. Another Disease 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 nourishment. Another Disease is, over-rankness of the Corn, which they use to remedy by Mowing it after it is come up, or putting Sheep into it. Another 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 preservative; the Mingling of Seed-Corn with Ashes, is thought to be good; the Sowing at the wane 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 Mistletoe 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 Houlleek doth good. Though Grain that toucheth Oyl or Fat receiveth hurt, yet the steeping of it in the Drops of Oyl, when it beginneth to putrefy, (which they call Amurea) is thought to allure 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 last better then others. The Corn which in the Vanning lieth lowest is the best; and the Corn which broken or bitten, 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, insomuch as it hath been known to go three cubits deep; and that it is the Root that continueth fit (longest) to be set again, of any Root that growth. It is a cold and acide Herb, that (as it seemeth) loveth the Earth, and is not much drawn by the Sun.
N<sub>at</sub>ural His<sub>t</sub>r<sub>y</sub>;

673. It hath been observed, that some Herbs like bell being watered with Salt-water, as Radish, Bees, 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 wholesome Herbs; as, that the Snakes 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 shewed how eafie it was for a Philosopher to be rich, when he foretaw 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 Fruits. These we have partly touched before; but other Prognosticks of like nature are diligently to be enquired.

676. There seem to be in some Plants singularities, wherein they differ from all other. The Olive hath the 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 cutted Leaves, but Cabbage and Cabbage-Lettuce. None have double Leaves, one belonging to the Stalk, another to the Fruit or Seed, but the Arterchoak. 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 hapnheth oft, and may be much diversified; in others, such as hapnheth rarely, and admitteth little variety. For lo it is likewise in Beasts; Dogs have a resemblance with Wolves and Foxes, Horses with Asses, Kine with Bulses, Hares with Conesys, &c. And so in Birds; Kites and Kettrels have a resemblance with Harws; Common Doves with Ring-Doves and Turtles; Black-Birds with Thrushes and Magpies; 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 mere Inquisitions of Experience, and concoct it not.
Century VII.

It has 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 exukerating, 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 viscid, 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 subsistence; 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 uses: 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 stopped, and the Vessels let down into the Sea, will accelerate very much the making of them ripe and potable; the same would be tried in Wott.

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 any abundance of Heat and Moisture, though that indeed causeth Pilosity; but there is requisite to Pilosity, not so much Heat and Moisture, as Excrementitious Heat and Moisture; (for whatsoever assimilateth goeth not into the Hair) and Excrementitious Moisture aboundeth most in Beasts, and Men that are more savage. Much the same Reason is there of the Plumage of Birds; for Birds assimilateth lefs, and exccern more then Beasts, for their Excrements are ever aliquid, and their Flesh (generally) more dry; besides, they have not Instruments for Urine, and so all the Excrementitious Moisture goeth into the Feathers: And therefore it is no marvel though Birds be commonly better Meat then Beasts, because their flesh doth assimilateth more finely, and exccerneth more subtilly. Again, the Head of Man hath Hair upon the first Birth, which no other part of the Body hath. The cause may be want of 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 subsistence, nourisheth and assimilateth lefs, and exccerneth 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 peritable. And Children likewise are not Hairy, for that their Skins are more peritable.

Birds are of swifter motion than Beasts; for the Flight of many Birds is swifter then the race of any Beasts. The cause is, that the Spirits in Birds are in greater proportion, in comparison of the bulk of their Body, then in Beasts. For as for that Reason that some give, that they are partly carrièd, whereas Beasts go, that is nothing; for by that reason, swimming should be swifter then running: And that kind 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 Oyliness 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.

Fire burneth Wood, making it first Luminous, then black and brittle, and lastly, broken and incinerate; sealding Water doth none of these. The cause is, for that by Fire the Spirit of the Body is first refined, and then emitted; whereof the refining or attenuation causeth the light, and the emission first the fragility, and after the dissolution into Ashes, neither doth any other Body enter. But in Water, the Spirit of the Body is not refined so much; and besides, part of the Water enthrith, which doth increase the Spirit, and in a degree extinguish it; therefore we see that hot Water will quench Fire. And again, we see that in Bodies wherein the Water doth not much enter, but only the heat paffeth, hot Water worketh the effects of Fire: As in Eggs boiled and roasted, (into which the Water enthrith not at all) there is scarce difference to be discerned; but in Fruit and Flesh, where into the Water enthrith in some part, there is much more difference.

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 enthrith, so it doth alay heat where it toucheth. And therefore note well, that moisture, although it doth not pass through Bodies without Communication of some substance (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 fewer-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 while it 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 deprese, and diverted the motion on another way. For first, we see that the Hic-cough cometh of fulness of Meat, (especially Children) which causeth an extension of the Stomach; We see also, it is caufed by acide Meats or Drinks, which is by the pricking of the Stomach. And this motion is ceased, either by Diversion, or by Detention of the Spirits: Diversion, as in Sneezing; Detention, as we see holding of the Breath doth help somewhat to ceaze the Hic-cough, and putting a Man into an earnest study doth the like, as is commonly used: And Vinegar put to the Nostrils or Gargarized doth it also; for that it is Astringent, and inhibith 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, through 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, for that the humor which was descending to the Nostrils, is diverted to the Eyes.

The Teeth are more by cold drink, or the like, affected, than the other parts. The cause is double: the one, for that the resistance of Bone to cold, is greater than of Flesh; for that the Flesh shrinketh, but the Bone itself, 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 Cartel are spotted in their Tongues, &c. The cause is (no doubt) the tenderness of the part, which thereby receiveth more easily all alterations than any other parts of the Flesh.

When the Mouth is out of taste, 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 self 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 leaft, 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 than in other years.

Wife Physicians should with all diligence inquire what Simples Nature yieldeth, that have extreme subtile parts without any Mordication or Acrimony; for they undermine that which is hard, they open that which is stopp'd and shut, and they expel that which is offensive gentle, without too much perturbation. Of this kind is Eder-flower, which therefore are proper for the Stone; of this kind is the Dianth-spine, which is proper for the Jaundies; of this kind is Ham-horn, which is proper for Agues and Infections; of this kind is Timy, which is proper for Stoppings in the Head; of this kind is Funimony 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 Trichites of Vipers, (v which are so much magnified) and the flest of Snakes some ways canditised and corrected (which of late are grown into some credit) are of the same nature. So the parts of Beasts putrefied (as Cafforem and Musk, which have extreme subtil parts) are to be placed amongst them. We see also, that putrefaction of Plants (as Agarick and Jew's-Ear) are of greatest vertue. The cause is, for that putrefaction is the subtilest of all motions in the parts of Bodies, and since we cannot take down the lives of Living Creatures (which some of the Paracelsians say, if they could be taken down, would make us Immortal,) the next is, for subsilt 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 Enumachs, which are unable to generate, are (never-thelf) also dim-sighted. The cause of dimnes of sight in the former, is the ex- pence of Spirits; in the latter, the over-moisture of the Brain; for the over-moisture of the Brain doth thicken the Spirits visual, and obstructeth their passages, as we see by the decay in the sight in Age, wherealso the diminution of the Spirits concurreth as another cause. We see also, that blind-nesses cometh by Rheums and Cataracts. Now in Enumachs there are all the notes of moisture; as the swelling of their Thighs, the loosness of their Belly, the smoothness of their skin, &c.

The pleasure in the Act of Venus, is the greatest of the pleasures of the Senef: the matching of it with itch is improper, though that also be pleasi to the touch, but the causes are profound. First, all the Organs of the Senefes 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 0 are the parts for Generation; therefore Scaliger doth well to make the pleasure of Generation a sixth Sense. And if there were other differing Organs, and qualified Perforations for the Spirits to pass, there would be more then the five Senes: Neither do we well know whether some Beasts and Birds have not Senes 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 Senes, 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 Senes, 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 fwoon; for Drink, it is certain, that the pleasure of Drunkennes is ext the pleasure of Venus; and great Joys in wine) 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 cherish the Spirits, and calleth them forth, the Winter doth dull them. Furthermore, the Abstinence or Intermittence of the use of Venus, in mind and well habituated 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 then 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 Insects, to work effects upon perfect Creatures. Note, that the word Insecta agreeeth not with the matter, but we ever use it for brevities fake, intending by it Creatures bred of Putrefaction.

The Insects 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. Some, in what Woods moost, 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 venemous, but (contrariwise) are held by the Physicians to cleanse 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 Lices, which are bred by the sweat close kept, and somewhat airified by the Hair. The Excrements of Living Creatures do not only breed Insects when they are excrect, 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 aforesweet that are aforesweet 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 Nighingales. The Moth breedeth upon Cloth, and other Laminac, 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 Parfips, 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 God fbre breedeth of somewhat that swimmeth upon the top of the Water, and
is most about Ponds. There is a Worm that breedeth of the Dregs of Wine decayed, which afterwards (as is observed by some of the Ancients) turneth into a Grub. 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 Butterflies quicken with heat, which were benumbed with cold; so Spirits may exhalbe with heat, which were preserved in cold. It is affirmed, both by the Ancient and Modern Observation, that in Furnaces of Copper and Brass, where Chalcites is (which is Vitriol) often cast in to mend the working, there riseth suddenly a 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 to 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 putrefied 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 Grasshoppers eat up the Green of whole Countries, and Silk-worms devour Leaves twifly, 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 extreme variety, but the similar 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 off. 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 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 Ephemeras that live but a day. The cause is, the ephity 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) revivify, even when they seem dead, being brought to the Sun or Fire. The cause whereof is, the diffusion of the Vital Spirit, and the ephith diluting of it by a little heat. They flit 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 less confined to Organs than 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.

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and as the Joined for their Hills; and Bees do (admirably) know the way from a Floury Heath, two or three miles off to their Hives. It may be Gnats and Flies have their Imagination more mutable and giddy, as small Birds likewise have. It is said by some of the Ancients, that they have only the Sense of Feeling, which is manifestly untrue: for if they go forth right to a place, they must needs have Sights: Besides, they delight more in one Flower or Herb, then in another, and therefore have taste. And Bees are called with found upon Bras, and therefore they have hearing. Which though their Spirits be diffused, yet there is a Seat of their Senses in their Head.

Other observations concerning the Insecta, together with the Enumeration of them, we refer to that place where we mean to handle the Title of Animals in general.

A Man leapteth better with weights in his hands, then without. The cause is, for that the weight (if it be proportionable) strengtheneth the Sinews, by contracting them; for otherwise, where no contraction is needfull, weight hindreth. As we see in Horse Races. Men are curios 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 cast backwards, and then forwards, with so much the greater force; for the hands go backward before they take their raile, 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 Britathalo drawn, and kept in, cometh forth more forcibly: And in casting of any thing, the Arms, to make a greater swing, are first cast backward.

Of Musical Tones and unequal Sounds, we have spoken before, but touch the pleasure and displeasure of the Senses not so fully. Harsh Sounds, as of a Saw when it is sharpened, Grinding of one Stone against another, squeaking or screeching noises, make a chiefly 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 sights that are horrid, because they excite the memory of things that are odious or teardown; 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 incorporeally affect the Soul. This is most manifest in Music, and Concord, and Discord in Music. For all sounds, whether they be sharp or flat, if they be sweet, have a roundness and equality; and if they be harsh, are unequal. For a Concord it self is but a harshness of divers sounds meeting. It is true, that inequality, not laid upon, but passing, is rather an increace 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 these three degrees of pleasing and displeasing in Sounds; Sweet Sounds, Discord, and Harsh Sounds, which we call by divers names, as Screching, 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.
Here be Minerals and Fossiles in great variety, but of Veins of Earth Medicinal but few. The chief are, Terra Lemnia, Terra Sigillata communis, and Bola Arminick; 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 Spreding of Poison, Infection, and Putrefaction: And they have of all other simples the perfectest and purest quality of Drying, with little or no mixture of any other quality. Yet it is true, that the Bola 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 Sponges, which are gathered from the sides of Rocks, being as it were a large, but tough Mass. 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 Bulks, but crush'd together, will be transported in a very small room.

I'see meth that Fish that are used to the Salt-water, do nevertheless delight more in fresh. We see that Salmons and Smelts love to get into Rivers, though it be against the Stream. At the Haven of Constantinople you shall have great quantities of Fish that come from the Euxine Sea, that when they come into the Fresh-water, do intoxicrate and turn up their Bellies, so as you may take them with your hand. I doubt there hath not been sufficient Ex-
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periment made of putting Sea fish into Fresh-water, Ponds, and Pools. It is
a thing of great use and pleasure; for so you may have them new at some
good distance from the Sea: And besides, it may be the Fish will eat the
pleasanter, and may fall to breed. And it is said, that Calibester Oysters,
which are put into Pits, where the Sea goeth and cometh, (but yet so that
there is a Fresh-water coming alio to them when the Sea-voideth) become
by that means fatter, and more grown.

The Turkish Bow giveth a very forcible Shoot, inasmuch 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 Kind) doth
kill the other Motion, except it fell be killed by a violent Motion; and
in these instances of Arrows, for then the Motion of Attraction by Simili-
tude of Substance beginneth to shew itself. But we shall handle this point
of Nature fully in due place.

They have in Turkey, and the East, certain Confections, which they call
Servers, which are like to Candied Fruits, and are made of Sugar and
Lemons, or Sugar and Citrons, or Sugar and Violets; and some other Flowers;
and some mixture of Amber for the more delicate persons: And those they
dissolve in Water, and thereof make their Drink, because they are forbidden
Wine by their Law. But I do much marvel, that no Englishman, nor Dutchman,
or German, doth set up Brewing in Constantinople; considering they have such
quantity of Barley. For as for the generality of Men, frugality may be the
caufe of Drinking Water; for that it is no small saving to pay nothing for
ones drink; But the better sort might well be at the cost. And yet I wonder
the less at it, because I see France, Italy, or Spain, have not taken into use Beer
or Ale; which (perhaps) if they did, would better both their Healths and
their Complexions. It is likely it would be matter of great gain to any that
should begin it in Turkey.

IN Bathing in hot water, sweat (nevertheless) cometh not in the parts un-
der the Water. The cause is, first, for that sweat is a kinde of Colliqua-
tion. And that kinde 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
shuteth 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
hor. Secondly, Hot water doth cause Evaporation from the Skin; so as
it spendeth the matter in those parts under the Water, before it issueth in
Sweat,
Sweat. Again, Sweat 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, infect 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 fresh and sweet, turneth into Blood and Flesh; and the Sweat is only that part which is separates and excerned. Blood also raw, hath some saltness 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 fleesly, and Sweat infect (chiefly) those parts that are less fleesly and more dry, as the Forehead and Breast.

Men sweat more in sleep then waking, and yet sleep doth rather stay other Fluxions, then cause them; as Rheums, Loosness 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 becometh more violent and irritate, and thereby expelleth Sweat.

Cold Sweats are (many times) Mortal and near Death, and always ill and suspected; as in great Fears, Hypochondriac Pasions, &c. The cause is, for that Cold Sweats come by a relaxation or forfaking of the Spirits, whereby the Moisture of the Body, which Heat did keep firm in the parts, severteth and infecteth 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 Aques, Pestilences, &c. The cause is, for that Sweat in the latter fort is partly Critical, and fendeth forth the Matter that offendeth. But in the former, it either proceedeth from the Labor of the Spirits, which lighteth them oppressed; or from Motion of Contenu, 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 Glower is hitherto not well observed. Thus much we see, that they breed chiefly in the hottest Moneths 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 rechned but by Summer heat. And again, that by reason of the finenes, it doth easily exhalate. In Italy, and the Hotter Countreys, there is a Fie they call Luciole, that shineth as the Glower doth, and it may be the Flying-Glomer; but that Fie 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 Bushes. It may be the Glower 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, Shaking, and Screching. The Paleness 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 diffuselied; and not sustained. Standing upright of the Hair is caused, for that by shutting of the Pores of the Skin, the Hair thatly eth aloof must needs rise. Starting is both an apprehension of the thing feared, and in that kinde it is a motion of shrinking) and likewise an Inquisition in the beginning what the matter should be, and in that kinde it is a motion of Erection.) and therefore when a Man would list to any thing, he starteth; for the starting is an Erection of the Spirits to attend. Screching 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, Grinding 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 Rest to do it, by Motion of Consent they expel the Voice. And this is when the Spirits yield, and give over to refresh; for if one do constantly refresh Pain, he will not groan. Tears are caused by a Contraction of the Spirits of the Brain; which Contraction by consequence diminisheth the Moisture of the Brain, and thereby sendeth Tears into the Eyes. And this Contraction or Compressing 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 beat and refresh, and then to expel; which maketh the Parts knit first, and afterwards open. Grinding of the Teeth is caused (likewise) by a Gathering and Serrin of the Spirits together to refresh; 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 refresh, and then to expel.

715. 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 stirring. We know it hath been seen, that Excessive sudden Joy hath causeth present Death, while the Spirits did spread so much as they could not retire again. As for Tears, they are the effects of Compress of the Moisture of the Brain, upon Dilatation of the Spirits. For Compression of the Spirits worketh an Expression of the Moisture of the Brain by 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.

716. Anger causeth Paleness 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 Fist. Paleness, 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 Paleness be alone, without lending forth the colour again, it is commonly joined with some fear: But in many there is no Paleness 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 joyned with Fear. Swelling is caused both by a Dilatation of the Spirits by over-heating, and by a Liquefaction or Boiling of the Humors thereupon. Foaming at the Mouth is from the same cause, being an Ebulition. Stamping and Bending of the Fists 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 Reiling of the Spirits, but in a less degree. For the Shaking of the Head, is but a slow and definite Trembling; and is a Gesture of flight refusal: And we see also, that a dislike causeth often that Gesture of the Hand, which we use when we refuse a thing, or warn it away. The Frowning and Knitting of the Brows, is a Gathering or Serring of the Spirits, to resist 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 Reform 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; Orc Pompeii quid molimus? Nunquam non coram pluribus erubuis; and likewise, when we come before Great or Reverend Persons.

Pity causeth sometimes Tears, and a Flexion or Caft of the Eye aside. Tears come from the cause, that they do in Grief: For Pity is but Grief in another's behalf. The Caft of the Eye, is a Gesture of Aversion or Loathness to behold the object of Pity.

Wonder causeth Astonishment, or an Immovable Posture of the Body, Calling up of the Eyes to Heaven, and Lifting up of the Hands. For Astonishment, it is causeth by the Fixing of the Mind upon one object of Cogitation, whereby it doth not spatiate and transfuse as it useth: For in Wonder the Spirits fly not, as in Fear; but only settle, and are made less apt to move. As for the Calling up of the Eyes, and Lifting up of the Hands, it is a kind 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 to be understood, that Laughing is one of the Passions of the Body, hath his Source from the Understanding; for in Laughing, there is a preceding 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 Mind) it is moved, and that in great vehemency, only by Tickling some parts of the Body. And we see, that Men even in a grieved state of Mind, yet cannot sometimes forbear Laughing. Thirdly, it is ever joyned with some degree of Delight: And therefore Exhilaration hath some Affinity with Joy, though it be much Lighter Motion. Res severas et ferum Caduca: Fournet.
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Fourthly, That the object of it is Deformity, Absurdity, Shred 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 Breasts 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 spoke of the Tears of Joy and Grief;) it is an effect of Dilatation of the Spirits. And for Suddenness, it is a great part of the Matter: For we see that any Shred turn that lighteth upon another, or any Deformity, &c. moveth LAUGHTER in the infant, which alter a little time it doth not. So we cannot Laugh at any thing after it is stale, but whilst it is new. And even in Trouble, if you tickle the fides, and give warning, or give a hard or continued touch, it doth not move LAUGHTER so much.

Luft causeth a Phlogenity in the Eys, and Priapism. The cause of both these is, that in Luft the Sight and the Touch, are the things desired; and therefore the Spirits refer 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 refer most to the parts that labor most, or are most affected. As in the last, which hath been mentioned, they refer to the EYES and Venereous parts; in Fear and Anger to the HEART; in Shame to the FACE; and in Lights and Takes to the HEAD.

That hath been observed by the Ancients, and is yet believed, That the Sperm of Drunken-men is unfruitful. The cause is, for that it is over-moistened, and wanteth 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 Deflution in voluntary Motion; they reel, they tremble, they cannot stand, nor speak strongly. The cause is, that the Spirits of the Wine oppress 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 Opiates and Sempatifives (as Popp., Henbane, Hemlock, &c.) induce a kind of Drunkenness by the grossness of their Vapor, as Water doth by the quantity of the Vapor. 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 lees luke 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 that the Spirits themselves turn, being comprized by the Vapor of the Wine; (for any Liquid Body upon Compressiun turneth, as we see in Water;) and it is all alike 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 weaknesse of the Spirits: for in every Megrim or Vertigo, there is an Obtenereation joyned with a semblance of Turning round, which we see also in the lighter lott of Spoonings.

The
The cause of seeing things out of their place, is the refraction of the Spirits visual; for the vapour is as an unequal Medium, and it is as the flight of things out of place in Water. The cause of seeing things double, is the swift and unquiet motion of the Spirits (being oppressed) to and fro; for (as was said before) the motion of the Spirits visual, and the motion of the object make the same appearances; and for the swift motion of the object, we see that if you fillip a Line string, it flyeth double or treble.

Men are sooner Drunk with small draughts then with great. And again, Wine furred, inebrieth less then Wine pure. The cause of the former is, that the Wine defcendeth not to fall to the Bottom of the Stomack; but maketh longer stay in the upper part of the Stomack; and sendeth Vapors faster to the Head, and therefore inebrieth sooner. And for the same reason, Sops in Wine (quantity for quantity) inebriate more then Wine of itself. The cause of the latter is, that the Sugars doth infirm the Spirits of the Wine, and maketh them not so easy to resolve into Vapour. Nay further, it is thought to be some remedy against inebriating, if Wine furred be taken after Wine pure. And the same effect is wrought, either by Oyl or Milk taken upon much Drinking.

The use of Wine in dry and consumed Bodies is hurtful; in moist and full Bodies it is good. The cause is, 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, there Wine helpeth to digest and deficate the moisture.

The Caterpillar is one of the most general of Worms, and breedeth of Dew and Leaves; for we see 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 dry windy. And so, we see upon the Ground, whereupon the Dew sticketh: But especially Caterpillars, both the greatest and the most, 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 Butterfie, or perhaps some other Flie. There is a Caterpillar that hath a Fur or Down upon him, and seemeth with the Silk worm.

The Fies 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 sharpeness. For the Fig hath a Milk in it that is sweet and corrosive; the Pine-Apple hath a Kernel that is strong and abiterive; the Fruit of the Bryar is said to make Children, or those that eat them, cabbased. And therefore no marvel though Cantharides have such a Corrosive and Cauterizing quality; for there is not one other of the Insects, 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 Corroative quality.

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Altitude is remedied by Bathing or Anointing with Oyl and warm Water. The cause is, for that all Altitude is a kind of Contusion and Compression of the Parts; and Bathing and Anoition give a Relaxation or Emolition: And the mixture of Oyl and Water is better then either of them alone, because Water entrance better into the Pores, and Oyl after entry softened better. It is found also, that the taking of Tobacco doth help and discharge Altitude. The reason whereof is partly, because by clearing or comforting of the Spirits, it openeth the Parts compressed or contused: And chiefly, because it refreeth the Spirits by the Opiate Virtue thereof, and so dischargeth 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 Secundine or Call, but not rightly; for that were to make every casting of the Skin a new Birth: And besides, the Secundine is but a general Cover, not shaped according to the Parts; but the Skin is shaped according to the Parts. The Creatures that cast their Skin are, the Snake, the Viper, the Grasshopper, the Lizard, the Silk-worm, &c. Those that cast their Shell are, the Lobster, the Crab, the Cra-fish, the Horsmandor or Dolphin, the Tortoise, &c. The old Skins are found, but the old Shells never: So as it is like they scale off, and crumble away by degrees. And they are known by the 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 putteth off the old; and no Birds that have much matter for their Beak, call their Beaks, the new Beakputting off the old.

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Ring not Freck but Hollow, which is in the making of the Bed, or with the Legs gathered up, which is in the posture of the Body, is the more wholesome. The reason is the better comfortting of the Stomach, which is by that left pensile; and we see, that in weak Stomachs, the laying up of the Legs high, and the Knees almost to the Mouth, helpeth and comforteth. We see also, that Gaily-flus, notwithstanding their misery otherwise, are commonly fat and fleshy, and the reason is, because the Stomach is supported from what in sitting, and is pensile in standing or going. And therefore for Prolongation of Life, it is good to chuse those exercises where the Limbs move more then the Stomach and Belly; as in Rowing and in Sawing, being set.

Migrains and Giddiness are rather when we sit, after long sitting, then while we fit. The cause is, for that the Vapors which were gathered by sitting, by the sudden Motion are more up into the Head:

Leaning upon any Part maketh it Num, and as we call it, Affect. The
The cause is, for that the Compression of the Parts suffereth not the Spirits to have free access; and therefore, when we come out of it, we feel all lingering or pricking, which is the re-entrance of the Spirits.

It hath been noted, That those Years are pestifential and unwholesome, when there are great numbers of Frogs, Flies, Locusts, &c. The cause is plain; for that those Creatures being engendred of Putrefaction, when they abound, shew a general disposition of the Year, and constitution of the Air to Diseases of Putrefaction. And the same Prognostick (as hath been laid before) holdeth, if you finde Worms in Oak-Apples. For the Constitution of the Air appeareth more futilely in any of these things, then to the sense of Man.

It is an observation amongst Country people, that Years of Floræ 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 Mouldire in the Summer precedent, which putreth forth those Fruits, and mult needs leave great quantity of cold Vapors not dissipate, which causeth 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 aromaticall, which they take, beaten into powder, in Water as hot as they can drink it: And they take it, and set at it in their Coffee-Houses, which are like our Taverns. This Drink comforteth the Brain and Heart, and helpeth Digestion. Certainly this Berry Coffee, the Root and Leaf Betel, the Leaf Tobacco, and the Tear of Poppy, (Opium) of which, the Turks are great takers (supposing it expelleth all fear; do all condence the Spirits, and make them strong and alert. But it seemeth they are taken after severall manners; for Coffee and Opium are taken down, Tobacco but in Smoak, and Betel is but champed in the Mouth with a little Lime. It is like, there are more of them, if they were well found out, and well corrected. Quere, of Henbane-Seed, of Mandrake, of Saffron, Root and Flower, of Foliwm Indum, of Ambergris, of the Africam Amomum, if it may be had; and of the Scrotus 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 Alcuba, 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 Natives 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 say) with a Lenden Comb, or the like. As for the Chinese, who are of an ill Complexion, (being Olirafter) they paint their Cheeks Scarlet, especially their King and Granilire. Generally, Barbarous People that go naked, do not onely paint them...
740. Experiment Solitary, touching the Use of Bathing and Anointing.

741. Experiment Solitary, touching the Chamoletting of Paper.

742. Experiment Solitary, touching the Castle-Ink.

743. Experiment Solitary, touching the Encreaf of Weight in Earth.

744. Experiments in Comfort, touching Sleep.

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themselves, but they pounce and tafe 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 PIths and Brisons. So that it fecmeth 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 Grecians it was as usual as Eating or Sleeping; and is it amongst the Turks at this day; whereas, with us it remaineth but as a part of Phyfic. I am of opinion, that the use of it as it was with the Romans, was hurtful to health; for that it made the Body soft and easie to waife. 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 Chamois or Marble.

It is somewhat strange, that the Blood of all Birds, and Beasts, and Fishes, should be of a red colour, and only the Blood of the Cuttle should be as black as Ink. A man would think that the caufe should be the high Condensation of that Blood; for we see in ordinary Puddings, that the Boyling 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 preserve 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 rile, 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 condene; and so turneth within that small Mould into a degree of Moifure, which produceth weight. So hath been obferved, that Tobacco cut and weighed, and then dryed by the Fire, lofeth weight; and after being laid in the open Air, recovereth weight again. And it should ftem, that as soon as ever the River beginneth to increafe, the whole Body of the Air therefore suffereth a change: For (that which is more strange) it is credibly affirmed, that upon that very day, when the River first rife, great Plagues in Cairo ufe suddenly to break up.

Those that are very cold, and especially in their Feet, cannot get to Sleep. The caufe may be, for that in Sleep is required a free refpiration, which cold doth shut in and hinder: For we see, that in great Colds, one can scarce draw
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draw his Breath. Another cause may be, for that Cold calleth the Spirits to 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 noies (whereof we make in the 112 Experiment) help Sleep: as the blowing of the Wind, the trickling of Water, humming of Bees, soft fingering, reading, &c. The cause is, for that they move in the Spirits a gentle attention; and whosoever moveth attention, without too much labor, stilleth the natural and discursive motions of the Spirits.

Sleep nourished, or at least preserved, 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. Beasts 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. Quere 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 natura, it may be thought of; but howsoever, the nature of the Teeth deveth 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 Timber-house, where the Walls and other parts have Columns and Beams; but the Roof is in the better sort 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 Bird 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 Tortoise) 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 flee to the extremities of the Body; as Skull, Horns, Teeth, Nails, and Beaks; only 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
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751. is rather Sinew; for Marrow hath no Sense, no more than 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 only 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.

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 Divisior, as Pyrrhus had. Some Creatures have over-long or out-growing Teeth, which we call Fangs or Ticks; as Boars, Pikes, Salmons, and Dogs, though lefs. 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 to again have Dogs. Some Fishes have divers Rows of Teeth in the Roof of their Mouths, as Pikes, Salmons, Trious, &c. and many more in Salt-waters. Snakes and other Serpents have venomous Teeth, which are sometimes mistaken for their Sting.

No Beast 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 Horn; nor yet is converso, for Doe that have no Horns, have no upper-teeth.

Horses have, at three years old, a Tooth put forth which they call the Colts-tooth; and at four years old, there cometh the Mark-tooth, which hath a hole so big as you may lay a Pea 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.

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. Quære of the manner of the coming of them forth. They tell staled of the old Countes of Deuland, who lived till she was Seventicore years old, that she did Dente 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 preferring of them. 2. The keeping of them white. 3. The drawing of them with least pain. 4. The staying and eating 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 retorting Teeth in Age. The inferences that give any likelihood of retorting Teeth in Age, are, The late coming of Teeth in some, and the renewing of the Beaks in Birds, which are commaterial with Teeth. Quære therefore more particularly how that cometh. And again, the renewing of Horns. But yet that hath not been known to have been provoked by Art; 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 than 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 Wush, 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 Cones, &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 Fulness; for Generation is from Redundancy. This Fulness ariseth from two causes, Either from the Nature of the Creature, if it be Hor, and Moift, and Sanguine, or from Plenty of Food. For the first, Men, Horses, Dogs, &c. which breed at all seasons, are full of Heat and Moiture: Deer are the fullest of Heat and Moiture amongst Birds, and therefore breed often, the Tame Dove almost continually. But Deer are a Melancholick dry Creature, as appeareth by their fearfulness, and the hardness of their Flesh. Sheep are a cold Creature, as appeareth by their mildness, and for that they seldom drink. Most sorts of Birds are of a dry substance in comparison of Beasts; Fishes are cold. For the second cause, Fulness of Food, Men, Kine, Swine, Dogs, &c. feed full. And we see, that those Creatures which, being Wilde, generate seldom, being tame, generate often; which is from warmth and fulness of food. We finde that the time of going to Rut of Deer is in September, for that they need the whole Summers Feed and 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 is busie in fisting, or rearing her young; and therefore it is found by experience, that if you take the Eggs or Young-ones out of the Nests of Birds, they will fall to generate again three or four times one after another.

Of Living Creatures, some are longer time in the Womb, and some shorter. Women go commonly nine Moneths, the Cow and the 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 decidysis or hatching. And amongst Birds there is less diversity of time than amongst other Creatures, yet some there is; for the Hen sitteth but three weeks, the Turk-y-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,
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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 Colt hath about four years of growth, and to the Fawn, and to 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 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 Bitches, Hares, Conies, &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 fewer the Sperm.

Here is no doubt but Light by Refraction will shew greater, as well as things coloured; for like as a Shilling in the bottom of the Water will shew greater, so will a Candle in a Lantern in the bottom of the Water. I have heard of a practice, that Glowworms in Glasses were put in the Water to make the Fish come. But I am not yet informed, whether when a Diver diveth, having his eyes open, and swimmeth upon his back, whether (I say) he seeth things in the Air, greater or less. For it is manifest, that when the eye standeth in the finer medium, and the Object is in the groffer, things shew greater, but contrariwise, when the eye is placed in the groffer medium, and the object in the finer, how it worketh I know not.

It would be well boulted out, whether great Refractions may not be made upon Reflexions, as well as upon direct beams. For example, we see, that take an empty Balon, put an Angel of Gold, or what you will into it; then go so far from the Balon till you cannot see the Angel, because it is not in a right Line; then fill the Balon with Water, and you shall see it out of his place, because of the Reflexion. To proceed therefore, put a Looking-glasse into a Balon 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 Cellar 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 glasse 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 Steeples, 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 refract. The cause is, partly because Motion doth disturb the Torpoure 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 refract doth get, by the resistance of the Body upon which it refract, a stronger compression.
compression of parts then it hath of it self, and therefore needeth more force to be put in motion. For if a weighty Body be profile, and hang but by a thred, the percussion will make an impulsion very near as causeth as if it were already in motion.

A Body over-great or over-small, will not be thrown so far as a Body of a middle size; so that (as seemeth) there must be a commenfuration or proportion between the Body moved, and the force, to make it move well. The caufe is, because to the Impulsion there is requisite the force of the Body that moveth, and the reflance of the Body that is moved; and if the Body be too great, it yieldeth too little; and if it be too small, it reflinate too little.

It is common experience, that no weight will press or cut so strong being laid upon a Body, as falling or strucken from above. It may be the Air hath some parts in furthering the percussion: But the chief caufe I take it to be, for that the parts of the Body moved, have by impulsion, or by the motion of gravity continued, a compreffeion in them as well downwards, as they have when they are thrown or fhot through the Air forwards. I conceive alfo, that the quick loafe of that motion preventeth the reflance of the Body below; and priority of the force (always) is of great efficacy, as appeareth in infinite iffances.

Tickling is most in the Soles of the Feet, and under the Arm-bales, and on the Sides. The caufe is, the thinnes of the Skin in those parts, join'd with the rarefnes of being touch'd there; for all Tickling is a light movement of the Spirits, which the thinnes of the Skin, and suddennes and rarefnes of touch do further: For we fee a Feather or a Kifh drawn along the Lip or Check, doth tickle; whereas a thing more obtufe, or a touch more hard, doth not. And for suddennes, we fee no man can tickle himself: We see alfo, that the Palm of the Hand, though it hath as thin a Skin as the other parts mentioned, yet is not tickleth, because it is accufomed to be touch'd. Tickling alfo caufeth Laughing. The caufe may be the emifion of the Spirits, and of the Breath, by a flight from Titillation; for upon Tickling, we fee there is ever a ftring or fhrinking away of the parts to avoid it; and we fee alfo, that if you tickle the Noftrils with a Feather or Straw, it procureth Sneezing, which is a fudden emifion 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 Nileus overflowing, as it doth the Country of Egypt, there should be nevertheless little or no Rain in that Country. The caufe must be, either in the Nature of the Water, or in the Nature of the Air, or on 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 concotion of the Waters; for Waters well concoted, 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 tale; 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 caufe must be,
for that the Air is of it self thin and thrifty, and as soon as ever it gretteth any moisture from the Water, it imbibeth, and dissipateth it in the whole Body of the Air, and suffereth it not to remain in Vapor, whereby it might breed Rain.

It hath been touched in the Title of Perlocations, (namely, such as are inwardly) that the Whites of Eggs and Milk do clarifie; and it is certain, that in Egypt they prepare and clarifie the Water of Nile, by putting it into great Jars of Stone, and stirring it about with a few stamped Almonds, wherewith they also beat near the Mouth of the Vessel; and so draw it off, after it hath refted some time. It were good to try this Clarifying with Almonds in new Beecr or Matt, to halten 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 Desarts of S. Marcus in Egypt, a Plant which is long. Leafles: brown of colour, and branched like Coral, fave that it closeth at the top. This being set in Water within House, spredeth and displayeth strangely; and the people thereabout have a superflitious belief, that in the Labor of Women it helpeth to the caufe Deliverance.

The Crystalline Venice-Glass is reported to be a mixture, in equal portions, of Stones brought from Pavia, by the River Ticinnis, and the Ashes of a Weed called by the Arabes, Kali, 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 felle them to the Venetians for their Glass-works.

It is strange, and well to be noted, how long Caraffes have continued uncorrupt, and in their former Dimensions; as appeareth in the Mummies of Egypt, having lafted, 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 Subftance the Fiatth of all the other parts of the Body is. But it should seem, that according to our obfervation and axiom, in our hundredth Experiments, Purification, which we conceive to be So natural a Period of Bodies, is but an accident, and that Matter maketh not that hath to Corruption that is conceived; and therefore Bodies in shining Amber, in Quick-silver, in Balm, (whereof we now fpeak) 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 faid in the aforesaid Experiments concerning Annihilation, namely, That if you provide against three caufes of Purification, Bodies will not corrupt. The first is, that the Air be excluded; for that undermineth the Body, and confpireth with the Spirit of the Body to difsolve it. The fecond is, that the Body adjacent and ambient be not Commaterial, but meerly Heterogeneous towards the Body that is to be preserved; for if nothing can be received by the one, nothing can issue from the others: such are Quick-silver and White Amber to Herbs and Flies, and fuch Bodies. The third is, that the Body to be preserved, be not of that gros that it may corrupt within it self, although no part of it influe into the Body adjacent; and therefore it muat be rather thin and
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and final ite of Bulk. There is a fourth Remedy also, which is, That if the Body to be preferred, be of bulk, as a Corps is, then the Body that in- closeth it must have a virtue to draw forth and dry the moisture 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, whereof the one contained the Body of King Numa, it being some Four hundred years after his death; and the other, his Books of Sacred Rites and Ceremonies, and the Discipline of the 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 feemeth, 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 Embalmng (which no doubt was of the best) the Body was softened, as Cæsar touching but the Nole 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 shrowded in a number of folds of Linnen, betameared with Gums, in manner of Scar-cloth; which it doth not appear, was practised upon the Body of Alexander.

Near the Castle of Cæcie, and by the Wells Affin, in the Land of Iduman, a great part of the way, you would think the Sea were near hand, though it be a good distance. And it is nothing, but the shining of the Nitre upon the Sea-fands; such abundance of Nitre the Shores thereof put forth.

The Dead-Sea, which vomiteth up Bitumen, is of that Gratitudine. as Living Bodies, bound hand and foot, and cast into it, have been borne up and not sunk: Which theveth, that all sinking 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 Quick-silver, (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 Quick-silver.

It is reported, that at the Foot of a Hill near the Mare mortuum, there is a Black Stone (whereof Pilgrims make Fires) which burneth like a Coal and diminisheth not, but onely wakeneth brighter and whiter. That it should do so, is not strange; for we see Iron red hot burneth and consumeth not. But the strangeness is, that it should continue any time so; for Iron, as soon as it is out of the Fire, deadeh 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 of a kinde of Mineral which whiteth also in the burning, and consumeth not. The Question is this. Flame must be made of somewhat; and commonly it
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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 Saturni. But then you will say, that such 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 burn.

Sea-coal last longer than Char-coal; and Char-coal of Rocks, being cooled into great pieces, last longer than ordinary Char-coal. Turf, and Peat, and Cow-creeds are cheap Jewels, and last long. Small-coal or Char-coal poured upon Char-coal make them last longer. Sedge is a cheap Jewel to Brew or Bake with, the rather, 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 privily, 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 Pot-thern 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 freeness in great Heats. And it is said, there are some Rooms in Italy and Spain for freeness, and gathering the Winds and Air in the Heats of Summer; but they be but Penning's of the Winds, and enlarging them again, and making them reverberate, and go round in Circles, rather than 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 talting of Air, to discover the wholefomeness or unwholefomeness as well of Seafons, 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 persuaded, that a piece of raw Flee or Fith, will sooner corrupt in some Airs then in others. They benoble Experiments that can make this discovery; for they serve for a Natural Division of Seafons, better then the Astronomers can by their Figures; and again, they teach men where to chule their dwelling for their better health.

There is a kinde of Stone about Bethlehem which they grinde to powder, and put into Water, whereof Cattle drink, which maketh them give more Milk. Surely, there would be some benere Tryals made of Mixtures of Water in Ponds for Cattle, to make them more Milch, or to fatten them, or to keep them from Murrain. It may be, Chalk and Nitre are of the bеst.

It is 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 glasse 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 speake 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 Waters: it is soft, and green of colour; but being brought into the Air, it becometh hard, and thinning 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 require 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 each Mulberry-tree as grow in the Valleys: And Manna falleth upon the Leaves by night, as other Dews do. It should seem, that for that 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 infuseth 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 brillich, 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 Wine, to keep them from Fuming and Inebriating, by adding some Sulphur or Album; whereas the one is Ulcinous, and the other is Astringent. And certain it is, that those two Natures do represent the Fumes. This Experiment would be trans- ferred 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 Wildfires (whereof the principal ingredient is Bitumen) do not quench with Water, is, for that the first concretion of Bitumen, is a mixture of a fiery and watry Substance; fo 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 yiel- eth 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 Cumae, is said to have the Walls plastered. And it is certain, and tried, that the Powder of Load-Stone and Flint, by the addition of Whites of Eggs and Gum-dragon, made into Paste, will in few days harden to the hardnesh 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, Drynys maketh them more apt to Consolidate. And in Modern observation, the like difference hath been found between French men and English men; whereas the one Constitution is more dry, and the others more moist: And therefore a Hurt of the Head is harder to cure in a French-man, and of the Leg in an English-man.

I T hath been noted by the Ancients, that Southern Winds blowing much without Rain, do cause a fervent 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 refrigerate in part, and check the fruitful Heat of the Southern Wind. Therefore this holdeth not in the Sea-coasts, because the vapor of the Sea without Showers doth refreh.

I T hath been noted by the Ancients, that Wounds which are made with Brass, heal more easily then 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 Corroitive, and not Sanative. And therefore it were good that the Instruments which are used by Chirurgions about Wounds were rather of Brass than Iron.

In the cold Countreys, when Mens Noses and Ears are mortified, and (as it were) Gangrened with cold, if they come to a Fire, they rot off presently. The cause is, for that the few Spirits that remain in those parts are suddenly drawn forth, and so 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 hae Nivem sicco Lтанam, Gelo sicco Cnrones saggit; whereby he did infer, that Snow did warm like Wood, 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 Heat, and retort to things that are Refrigerant, with an inward warmth and virtue of cherishing.

W Eight Iron and Aqua-fortis severally, then dissolve the Iron in the Aqua-fortis, and weigh the Dissolution; and you shall finde it to bear as good weight as the Bodies did severally, notwithstanding a good deal of waife by a thick vapor that suffeth during the working; which sheweth, that the opening of a Body doth increace the weight. This was tryed once or twice, but I know not whether there were any Error in the Tryal.

Take of Aqua-fortis two Ounces, of Quicksilver 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
Water will increase his power of bearing; as we see Broyn, when it is felt enough, will bear an Egg. And I remember well a Phisician, that used to give some Mineral Baths for the Gout &c. And the Body when it was put into the Bath, could not get down so easily as in ordinary Water. But it seemeth, the weight of the Quicksilver, more then the weight of a Stone, doth not compensate the weight of a Stone, more then the weight of the Aquafortis.

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 impulse; which is the cause (though hitherto not found out, as hath been often said) of all Violent Motions: And when the hinder part moveth swifter (for that it is,) endureth pressure of parts then the forward part can make way for it, must needs be that the Body turn over; for (turned) it can more easily draw forward the lighter part.

Galileus noteth 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 dasy 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 Senses which are very offensive, do cause the Spirits to retire; and upon their flight, the parts are (in some degree) dissipated, and no 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 of the Nose. But in Horses, that can use no such help, we see the finell of a Carriion, especially of a dead Horse, maketh them fly away, and take on almoft, as if they were mad. For Feelings, 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 in to sudden darkness, induceth an offer to shiver.

There is in the City of Ticina in Italy, a Church that hath Windows only from above; it is in Length an hundred Feet, in Breadth 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 fadeth and dieth by little and little, as the Echo at Pem-Charlton doth, and the voice foundeth 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 over against the Door, not. Note, that all Echoes sound better against old Walls then 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 a cide things, which let the Teeth on edge, this object tainteth the imagination; so that he that feeth the thing done by another, hath his own Teeth alfo set on edge. So if a man see another turn swiftly and long, or if he look upon Wheels that turn, himself waxeth Turn-lid. 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 setteth 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 Stock-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 Glasses, 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 than it was. If you compare it with another Flower, gathered at the same time, it will be the more manifest. This sheweth, that Bodies do preserve excellently in Quick-silver; and not preserve onely, but by the coldness of the Quick-silver, indurate. For the freshness of the Flower may be more Conservation, (which is the more to be observed, because the Quick-silver presseth the Flower) but the stiffernes 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 Cyprus there is a kind of Iron, that being cut into little pieces, and put into the ground, if it be well watered, will encreafe into greater pieces. This is certain, and known of old, that Lead will multiply and encreafe; 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, infomuch, 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 Elektrum had in it a fifth of Silver to the Gold, and made a Compound Metal, as fit for most uses as Gold, and more repleffent, and more qualified in some other properties; but then that was easily separated. This to do privily, or to make the Compound for the rich Metal simple, is an adulteration or counterfeiting; but if it be done avowedly and without disguising, it may be a great saving of the richer Metal. I remember to have heard of a man skilful in Metals, that a fifteenth part of Silver incorporate with
Gold is the only Substance which hath nothing in it Volatile, and yet melteth without much difficulty. The Melting flameth, that it is not jeune or scarce in Spirit, so that the fixing of it is not want of Spirit to fill out, but the equal spreading of the Tangible parts, and the close conservation 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 so close as in Gold; as we see by the calsie admission of Light, Heat, and Cold, and by the smallness of the weight. There are other Bodies fixed, which have little or no Spirit, so as there is nothing to fill out; as we see in the Stuff, whereof Coppels are made, which they put into Furnaces, upon which Work-eth not. So that there are three causes of Fixation: the Evacuation both of the Spirits and Tangible parts; the Clostness of the Tangible parts; and the Jejuneness or extreme Communion of Spirits: Of which three, the two first may be joyned with a Nature Liquefiable, the last not.

It is a profound Contemplation in Nature, to consider the Emptiness (as we may call it) or Insatisfaction of several Bodies, and of their appetite to take in others. Air taketh in Lights, and Sounds, and Smells, and Vapours: And it is most manifest, that it doth it with a kind of Thirst, as not satisfied with his own former Confinement; for else it would never receive them in so sudden and easily. Water and all Liquours do hastily receive dry and more Terrestrial Bodies proportionable; and Dry Bodies, on the other side, drink in Waters and Liquours: So that (as it was well said by one of the Ancients, of Earthy and Watry Substances) one is a Glue to another. Parchments, Skins, Cloths, &c. drink in Liquours; 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 Gold, that will not touch upon Silver, and conversely. And Gold, which seemeth by the weight to be the cloest and most solid Body, doth greedily drink in Quick-silver. And it seemeth, that this Reception of other Bodies is not violent; for it is (many times) reciprocal, and as it were, with Content. Of the cause of this, and to what Axiom it may be referred, consider attentively; for as for the pretty allusion, That Matter is like a Common Strumpet that deftreteth all Forms, it is but a Wandering Notion. Only Flame doth not content itself to take in any other Body, but either to overcome, and turn another Body into it itself, as by victory, or itself to die and go out.
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 Electricity, 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 kindes of Bodies is far more subtil then 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 Loadstone 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 subtil Perceptions; for it is another Key to open Nature, as well as the Sense, and sometimes better: And besides, it is a principal means of Natural Divination; for that which in these Perceptions appeareth early, in the great effects cometh long after. It is true also, that it serveth to discover that which is hid, as well as to foretel that which is to come, as it is in many subtil Trials: As to try whether Seeds be old or new, the Sense cannot inform; but if you boil them in Water, the new Seeds will sprout sooner. And so of Water, the taste will not discover the best Water; but the speedy conuming of it, and many other means which we have heretofore set down, will discover it. So in all Physognomy, the Lineaments of the Body will discover those Natural Inclinations of the Minde, which Diffimilation will conceal, or Discipline will supprese. We shall therefore now handle only those two Perceptions which pertain to Natural Divination and Discovery, leaving the handling of

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Perception in other things to be disposed elsewhere. Now it is true, that Divination is attained by other means; as if you know the causes, if you know the Concomitants, you may judge of the effect to follow; and the like may be laid of Discovery. But we try our selves here to that Divination and Discovery chiefly, which is caused by an early or subtil Perception.

The aptness or propension of Air or Water to corrupt or putrefie, (no doubt) is to be found before it break forth into manifest effects at Dilecares, Blasting, or the like. We will therefore set down some Prognosticks of Pestilential and unwholsome years.

801. 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 breed of Putrefaction, doth portend Pestilential years.

802. 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.

803. Great Droughts in Summer, lasting 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 break forth of the Earth but a grose 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 Africa no Body will stir 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 Froisty Winter discharge it, which seldom succeddeth such Droughts.

The lefser Infections of the Small-Pox, Purple Fever, Agues in the Winter precedent, and hovering all Winter, do portend a great Pestilence in the Summer following: For Putrefaction doth not rise to its height at once.

804. It were good to lay a piece of raw Flesh or Fish in the open Air; and if it putrefie quickly, it is a sign of a disposition in the Air to Putrefaction. And because you cannot be informed, whether the Putrefaction be quick or late, except you compare this Experiment with the like Experiment in another year; it were not 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 kind and bigness within doors: For I judge, that if a general disposition be in the Air to putrefie, the Flesh or Fish will sooner putrefie abroad, where the Air hath more power then in the House, where it hath less, 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 great infection and infusion from the Earth, it were good to try that exposing 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 putrefies quickly, or no; for that likewise may disclose the quality of the Air, and vapor of the Earth, more or less 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; at the least for Lodges and Retiring-places for Health, (for Mansion-Houses respect provisions as well as health) wherein the Experiments above mentioned may serve.

But for the choice of Places or Seats, it is good to make trial, not only of aptness 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 are some Houses wherein Sweet Meats will swell, and Baked Meats will mould, more than in others; and Wainscots will also sweat more, so that they will almost run with Water: All 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 gross 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-Glisses, 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 set them, 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 causes, as for divers Provisions. That of Plenty of Haws, and Heeps, and Bryar-Berries, hath been spoken of before. If Wainscot or Stone, that have used to swell, be more dry in the beginning of Winter, or the drops of the Eaves of Houses come more slowly down then they used, it portendeth a hard and frosty Winter. The cause is, for that is the shew of 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 way, and the vapors arc not sufficiently multiplied.
An open and warm Winter portends a hot and dry Summer: For the Vapors, diperfed into the Winter showers; whereas Cold and Frost keep them in, and transport them into the late Spring and Summer following.

Birds that use to change Countries at certain Seasons, if they come earlier, do shew the temperature of Weather according to that Country whence they came: As the Winter Birds, (namely, Woodcocks, Teal, and Es.) if they come earlier, and out of the Northern Countries; with us shew cold Winters. And if it be in the same Country, then they shew a temperature of Season, like unto that Season in which they come; as Swallows, Bats, Cuckoos, &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 than those of Seasons: The Refounding of the Sea upon the Shore, and the Murmur of Winds in the Woods, without apparent Wind, shew Wind to follow. For such Winds, breathing chiefly out of the Earth, are not at first perceived, except they be pent by Water or Wood. And therefore a Murmur out of Caves like wise portends 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 obferving of the smaller Stars, is a sign of Tempests following. And of this kind ye shall finde a number of instances in our Inquisition de Venti.

Great Mountains have a Perception of the disposition of the Air to Tempests sooner, than the Valleys or Plains below. And therefore they say in Pales, When certain Hills have their Night-cap on, they mean mischief. The caufe 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 subtil Perceptions of Wind rising before Men finde it. We see the trembling of a Candle will discover a Wind, that otherwise we do not feel; and the Fleshy burning of Flames doth shew the Air beginneth to be unquiet; and so do Coals of fire, by calling off the ashes more then they use. The caufe 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 grafts or Chaff, or such light things into the Air.

When Wind expireth from under the Sea, as it causeth some reflounings of the Water, (whereof we spake before) so it causeth some light motions of Bubbles, and white Circles of Froth. The caufe 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 getteth into a Body, whereas in the first putting up, it cometh in little portions.

We spake of the Ashes that Coals call off, and of Grafts and Chaff carried by the Wind; so any light thing that moveth when we find no Wind, sheweth a Wind at hand: As when Feathers or Down of Thistles flie to and fro in the Air.

For Prognosticks of Weather 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 especially Birds who live in the Air free and clear, 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 fly together from the sea towards the shores; and contrariwise Land Birds, (as Crows, Swallows, &c.) when they fly from the land to the VVaters, and beat the VVaters with their VWings, do foretell Rain and VVind. The cause is, Pleasure that both kindes take in the moistness 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 likest VVaters; and Land Birds also (many of them) delight in Bithing and moist Air. For the same reason also, many Birds do prune their Feathers, and Geee do guggle, and Crows seem to call upon Rain. All which is but the comfort they seem to receive in the retentig of the Air.

The Heron when the fourth high, (so as sometimes the is seen to pass over a Cloud) sheweth VVinds: But Kites flying aloft, shew 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 grozller Air. But the Kite affecteth not so much the grosstress 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) fleeth against the VVind, as Trous 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 spread, 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.

Beafts do take comfort (generally) in a moist Air, and it maketh them eat their Meat better; and therefore Sheep will get up betimes in the morning to feed against Rain; and Cattle, and Deer, and Conesys will feed hard before Rain; and a Heifer will put up his Nose, and snuff in the Air against Rain.

The Trifal 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 VVintipe; which, if it open in the Morning, you may be sure of a fair day to follow.

Even in Meas, Aches, and Hurts, and Corns, do engravie 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 extremes bring the Gout.

VVorms, Vermine, &c. do foretell (likewise) Rain; for Earth-Wormes will come forth, and Moles will call up more, and Fleas bite more against Rain.

Solid Bodies likewise foretell 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 beateth back the Air against it self; but the latter is an inward dwelling of the Body of the VVood it self.
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 Viscio, &c.) provoke Appetite. And the Discharge which they call Appetus Caninus, consisteth in the Matter of an Acid and Glaceluglem in the Mouth of the Stomack. Appetite is also moved by four things, for that four things induce a contraction in the Nerves, placed in the Mouth of the Stomach, which is a great cause of Appetite. As for the cause why Oinions, and Salt, and Pepper in Baked Meats move Appetite, it is by Vellication of those Nerves; for Motion whetteth. As for Wormwood, Olives, Capers, and others of that kind, which participate of Bitterness, they move Appetite by Abatement. So as there be four principal causes of Appetite: the Refraction of the Stomach joined with some Dryness, Contraction, Vellication, and Abatement; besides Hunger, which is an emptiness; and ye over-falling 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 molt.

It hath been observed by the Ancients, that where a Rainbow leemeth 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 doth also 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 dissipated in the drawing up; neither do we know, whether some Water it self 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 sweetness 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 Baysale, which is but a kind of Water congealed, will sometimes smell like Violets.

Of sweet Smells, heat is requisite to concoct the Matter, and some Moiture to spread the Breath of them: For heat, we see that Woods and Spices are more odorate in the Hot Countries, than in the Cold. For Moifiture, we see that things too much dried lose their Sweetness; and Flowers growing smell better in a Morning or Evening, then at Noon. Some sweet smells are destroyed by approach to the Fire; as Violets, Wall-flowers, Gillflowers, Pinky, and generally all Flowers that have cool and delicate Spirits. Some continue both on the fire, and from the fire, as Rosse-water, &c. Some do scarce come forth, or at least not so pleasantly, as by means of the fire; as Juniper, Sweet Gums, &c. and all smells that are enclosed in a fast Body; but (generally) those smells are the most grateful where the degree of heat is small, or where the strength of the smell is assayed; for these things do rather wo the Sense, then fatiate it. And therefore the smell of Violets and Roses exceedeth in sweetnes that of Spices; and Gums, and the strongest sort of smells, are best in a west afar off.
It is certain, that no small influence but with emission of some corporeal substance; not as it is in Lights, and Colours, and Sounds: For we see plainly that smell doth precede nothing that distance that the other do. It is true, that some Woods of Oranges, and Heath of Roseneary, 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 these Woods and Heaths are of vast spaces? Besides, we see that smells do adhere to hard Bodies; as in perfuming of Gloves, &c. which scented them 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 Houfes and Stables be kept sweet, and so of Cage-Birds; and the Cat buried that which she voideth. And it holdeth chiefly in those Beasts which feed upon Flesh. Dogs (almost) only of Beasts delight in fetic odor; which scented 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, least ill, as Urine; and those that are from the third, yet least; for Sweat is not bad, as the other two, especially of some persons that are full of heat.

Like-wise most Putrefacions are of an odious smell, for they smell either fetid or moulid. The cause may be, for that Putrefaction doth bring forth such a confusion as is most contrary to the condition 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 ingraine. So mixture of many disagreeing colours is never unpleasant to the Eye: Mixture of discordant Sounds is unpleasant to the Ear; mixture or hotch-potch of many tastes is unpleasant to the palate; 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 parts. Nevertheless, it is strange, and seemeth to cross the former observation, that some Putrefacions and Excrements do yield excellent Odors; as Citrus and Musk, and, as some think, Amber-greene, for divers take it (though unprobably) to come from the Sperm of Elephants; and the Mole we speak of from Apple-trees is little better than an Excretion. The reason may be, for that there paffeth in the Excrements, and remaineth in the Putrefacions, some good spirits, especially where they proceed from Creatures that are very hot. But it may also be joined with a further cause, which is more subtile; and it is, that the Senses love not to be over-pleased, but to have a commixture of somewhat that is in itself ingraine. Certainly, we see how Discords in Musick, falling upon Concords, make the sweetest strains: And we see again what strange tastes delight the taste; as Red-beerings, Caviare, Parmesan, &c. And it may be thesame holdeeth in smells. For those kinds of smells that we have mentioned are all strong, and do pull and vellicate the Senses. And we finde also, that places where men Urine commonly have some smell of Violts. And Urine, if one hath eaten Nutmeg, hath so too.
The thoughtless, general, and indefinite Contemplations and Notions of the Elements, and their Conjugations of the Influences of Heaven, of Hot, Cold, Moisture, Drought, Qualities Active, Passive, and the like, have swallowed up the true Passages, and Processes, and Affections, 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 Processes 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. 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 caused 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 consifteth 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 disfolation, or notable alteration. But this is wrought by mission, or Suppression, or Suffocation of the Native Spirits, and also by the Dilatation 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 resultimg; which Medium is Corpus imperfectissimum, and is transitory, and not durable; as Miss Smoaks vapors, Chyle 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) Inquamation or Inconsolidation, which is a kind of Putrefaction; for the parts are in confusion till they settle one way or other.

The word Concoction or Digestion, is chiefly taken into use from Living Creatures, and their Organs, and from thence extended to Liquors and Fruits, &c. Therefore they speak of Meat concocted, Urine and Excrements concocted; and the Four Digestions (in the Stomach, in the Liver, in the Arteries and Nerves, and in the several parts of the Body) are likewise called Concoctions, and they are all made to be the 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 Concoction is, that it should signify the degrees of alteration of one Body into another, from Crudity to Perfect Concoction, which is the ultimity of that action or process. And while the Body to be converted and al tered is too strong for the efficient that should convert or alter it, (whereby it resists, and holdeth fast in some degree the first Form or Consistence) it is (all that while) Crude and Inconcoct, and the Process is to be called Crudity and Inconcoction. It is true, that Concoction is in great part the work of Heat; but not the work of Heat alone: For all things that further the Conversion or Alteration (as Ref, Mixture of a Body already concocted, &c.) are also means to Concoction. 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 devised, 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 more 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, Transmutation.

There are also divers other great alterations of Matter and Bodies, besides those that tend to Concoction and Maturation; for whatsoever doth so alter a Body, as it returneth not again to that it was, may be called Alteration 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 Plebeian 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 hand and occur, and not excited from sufficient number of instances, and those well collated.

The Consistencies of Bodies are very divers: Dense, Rare, Tangible, Pneumatic; Volatile, Fixed; Determinate, or Determinates; Hard, Soft; Cleaving, not Cleaving; Congelable, not Congelable; Liquefiable, not Liquefiable; Fragile, Tough; Flexible, Inflexible; Tridible, or to be drawn forth in length, Intradible; Porous, Solid; Equal and Smooth, Vagual; Pensuous and Fibrous; and with Grains, Entire, and divers others. All which to refer to Heat and Cold, and Moister and Drought, is a Compendious and Inutile Speculation. But of these see principally our Aedical Nature, and otherwise the same as we shall now consider.

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 freely imprisoned, or again, that hold them better pleased and content, are Liquefiable: For these three Dispositions of Bodies do arrest the Emittance 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 same Emittance of the Spirits, whereby the grosser parts contract; and therefore Bodies juges 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,

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Century IX.

§ 39. Experiment Solitary, touching Alterations which may be called Major.

§ 40. Experiment Solitary, touching Bodies Liquefiable and not Liquefiable.
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 than Metal; and so Fiddle Earth is more Fragile than Crude Earth, and Dry Wood than Green. And the cause of this unaptness to Extension, is the small quantity of Spirits (for it is the Spirit that furthereth the Extension or Dilatation of Bodies;) and it is ever concomitant with Porosity, and with Drinels in the Tangible parts. Contrariwise, Tough Bodies have more Spirits, and fewer Pores, and Moistur Tangible parts: Therefore we see, that Parchment or Leather will stretch, Paper will not; Woollen-Cloth will tenter, Linnen scarcely.

All solid Bodies consist of Parts of two several Natures; Pneumatical, and Tangible: And it is well to be noted, that the Pneumatical Substance is in some Bodies, the Native Spirit of the Body; and in some other, plain Air that is gotten in; as in Bodies defecate, by Heat, or Age: For in them, when the Native Spirit goeth forth, and the Moisture with it, the Air with time getteth into the Pores. And those Bodies are ever the more Fragile; for the Native Spirit is more Yielding and Extensive (especially to follow the Parts) than Air. The Native Spirits also admit great diversity; as Hot, Cold, Active, Dull, &c. Whence proceed most of the Vertues, and Qualities (as we call them) of Bodies: But the Air intermixes, is without Vertues, and maketh things insipid, and without any extremula ion.

The Conversion of Bodies is (commonly) solveth by the contrary; as Ice, which is concealed by Cold, is dissolved by Heat; Salt and Sugar, which are excised by Heat, are dissolved by Cold and Moisture. The cause is, for that these operations are rather returns to their former Nature, than alterations; so that the contrary curing. As for Oyl, it doth neither easily congeal with Cold, nor thicken with Heat. The cause of both Effects, though they be produced by contrary efficaces, seemeth to be the same; and that is, because the Spirit of the Oyl, by either means, exhaleth little: For the Cold keepeth it in, and the Heat (except it be vehement) doth not call it forth. As for Cold, though it take hold of the Tangible Parts, yet as to the Spirits, it doth rather make them swell, than congeal them: As when Ice is concealed in a Cup, the Ice will swell instead of contracting, and sometimes rift.
OF Bodies, some (we see) are hard, and some soft: The hardness is caused (chiefly) by the Jeniament 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 less enduring of preturiture. As Steel, Stone, Glass, Dry Wood, &c. Softness cometh (contrariwise) by the greater quantity of Spirits, (which ever helpeth to induce yielding and effulion;) and by the more equal spreding of the Tangible parts, which thereby are more filling, and following: as in Gold, Lead, Wax, &c. But none; that soft Bodies (as we use the word) are of two kindes; the one, that easily giveth place to another Body, but altereth not Bulk by rising in other places; and therefore we see that Wax, if you put any thing into it, doth not rise in Bulk, but only giveth place: For you may not think, that in Printing of Wax, the Wax riseth up at all; but only the depressed part giveth place, and the other remaineth as it was. The other that altereth Bulk in the Cession, as Water, or other Liquors, if you put a Stone, or any thing into them, they giveth place (indeed) easily, but then they raise all over; which is a false Cession, for it is in place, and not in Body.

Like Bodies Dullible, and Tenible, (as Metals) that will be drawn into Wires; Wool, and Tow that will be drawn into Yarn or Thread; have in them the Appetite of Not discontinuing, strong; which maketh them follow the force that pulleth them out; and yet so as not to discontinue or forake their own Body. Vivious Bodies (likewise) as Pitch, Wax, Birdlime, Chiefcoaled, will draw forth and rope. But the difference between Bodies fibrous, and Bodies vivous, is plain: For all Woolh, and Tow, and Cotton, and Silk (especially raw Silk) have, besides their desire of continuance, in regard of the tenuity of their Thred, a greediness of Moisture; and by Moisture to joyn and incorporate with other Thred, especially, if there be a little Weathing, 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 impressible, and not impressible; figurable, and not figurable; mouldable, and not mouldable; feizable, and not feizable; and many other Passion of Matter, are Plebeian Notions, applied unto the Instruments and Usages, which Men ordinarily practice: but they are all but the effects of some of these causes following, which we will enumerare without applying them, because that would be too long. The first is the Cession, or not Cession 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 detention of the Spirits in Bodies. The eighth is, the dilatation or contraction of the Spirits in Bodies, while they are detained. The ninth is, the collocation of the Spirits in Bodies, whether the collocation be equal or unequal; and again, whether the Spirits be coacervate or diffus'd. The tenth is, the dentity or rarity of the Tangible parts.
the eleventh is the Equality or Inequality of the Tangible parts; the twelfth is the Diligence or Crudity of the Tangible parts; the thirteenth is the Nature of the Matter, whether Sulphurous, or Mercurial, or Water, or Oily, Dry, and Terrestrial; or Moift and Liquid; which Natures of Sulphurous 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 Wool of Textiles;) more inward or more outward: &c. The fifteenth is the Porosity or Imporosity betwixt the Tangible parts, and the greatness or smallness of the Pores; the sixteenth is the Collection 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 only to the vapor of the Lead, is less probable. Querr, 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 related, that in Tribus, there was Honey issuing from the Box-trees, which made Men mad. Again, in ancient times, 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 luscious 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 boil'd it in a Copper to the half; then they poured it into Earthen Vessels for a small time, and after turned it into Vessels of Wood, and kept it for many years. They have also, at this day in Russia, and those 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 recompence 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 stable, as they use Mead; for certainly, though it would not be so abietive, 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 Dileases: 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 Brafs, which (being polished) could scarce be discerned from Gold. This was in the Natural Ore, but I am doubtful, whether Men have sufficiently refined Metals, which we count Base: 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 Cements under Earth, that are very soft,
and yet taken forth in othe Sun, harden as hard as Marble: There are
also ordinary Quarries in Sommersetshire, which in the Quarry cut soft to
any signalls, and in the Building prove firm, and hard.

Living Creatures (generally) do change their Hair with Age, turning to
be Gray and White; as is seen in Men, though some earlier, some
later; in Horses, that are Dappled and turn White; in Old Squirrels, that turn
Grilly, and many others. So do some Birds; as Oyges from Gray turn
White; Hawks from Brown turn more White. And some Birds there be,
that upon their Moulting, do turn Colour; as Robin-Redbreast, after their
Moulting grow to be Red again by degrees; so do Gold-Fincher upon the
Head. The cause is, for that Moisture doth (chiefly) colour Hair and Feathers;
and Dryness turneth them Gray and White; now Hair in Age waxeth
Drier, so do Feathers. As for Feathers, after Moulting, they are young
Feathers, and so all one as the Feathers of young Birds. So the Beard is
younger than the Hair of the Head, and doth (for the most part) wax hoary
later. Out of this ground, a Man may devise the Means of altering the col-
our 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
discovered, 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 Hirsute, 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 Goldfinch-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 Bucks have Horns, Dovers none; Rams have more
wreathed Horns than Cows; Cock have great Combs and Spurs, Hens little
or none; Boars have great Fangs, Sowes much less; the Turkey-cock hath great
and swelling Gills the Hen hath less; Men have generally deeper and stronger
voices than Women. Some differ in faculty, as the Cock amongst Singing Birds,
are the best singers. The chief cause of all these (no doubt) is, for that the
Males have more strength of heat than the Females; which appeareth manifestly
in this, that all young Creatures Males are like Females; and so are
Eunuchs, and Gest Creatures of all kinds, like Females. Now heat causeth great-
ness 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 balanc’d with the moisture, then
there is no difference to be seen between Male and Female; as in the
incumences 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 to likewise Beards in Men. It also expellith
Natural History;

finer moisture, which want of heat cannot expel; and that is the cause of the beauty and variety of Feathers: Again, Heat doth put forth many Excrescences, and much 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 diathes the Pipes and Organs which causeth the deepness of the Voice. Again, Heat rethineth the Spirits, and that causeth 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 loaked 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 sitting doth vivifie, 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, grafted upon a Colewort-stalk, fedeth 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 some, that if the Cions be grafted, 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 styal to make Tobacco more Aromatical, 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 Decoction or Infusion of Indian Tobacco. But those are but sophistications and toyses; for nothing that is once perfect, and hath run his race, can receive much amendment; you must ever return to the beginnings of things for Melioration. The way of Maturation of Tobacco must (as in other Plants) be from the Heat, either of the Earth, or of the Sun. We see some leading of this in Musk-Melons, which are grown upon a hot Bed, dugged below, upon a Bank turned upon the South Sun, to give Heat by Reflection; laid upon Tiles, which increafeth the Heat; and coverede 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 Provence. There 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 Maturition of Fruits; yea, and the heat of Vi-

fication of Living Creatures, are both represented and supplied by the

heat of Fire; and likewise, the hearts of the Sun, and life, are represented

one by the other. Trees, set upon the Backs of Chimneys, do ripen Fruit

together. Vines, that have been drawn in at the Window of a Kitchen, have

sent forth Grapes, ripe a month (at least) before others. Stones, 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 Etrurians layeth her Eggs under Sand, where the heat of the Sun did clese

them.

Barley in the Boiling sweleth not much; Wheat sweleth more, &c.

extrremely; infomuch, as a quarter of a Pint (unboiled) will arise to a Pint

boiled. The caus (no doubt) is, for that the more close and compact the

Body is, the more it will dilate. Now Barley is the most hollow, Wheat

more solid than that, and Rice most solid of all. It may be also, that tome

 Bodies have a kinde of Lentor, and more perceptible nature than others; as

we see it evident in colouration; for a small quantity of Saffron, will tint

more, than a very great quantity of Bile, or Wine.

Rule of growth: sweet by Rowling or Pressure them gently with the Hind;

as Rowling Pears, Damasius, &c. By Rosennes is, as Medlars, Services, Sles,

Hepp. &c. By Time; as Apples, Wardens, Pomegranates, &c. By certain

special Maturations; as by laying them in Hay, Straw, &c. And by Fire; as

in Roasting, Stewing, Baking, &c. The caus of the sweetness by Rowling,

and Pressure is, Emolliion, which they properly endure; as in bearing of

Strearch, Fleish, &c. By Rosennes is, that the Spirits of the Fruit, by Pure-
faction, gather heat, and thereby digest the harder part. For in all Purefa-
tions there is a degree of heat. By Time and Keeping is, 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 fourths

confisteth in some grossness of the Body: And all incorporation doth make

the mixture of the Body, more equal, in all the parts, which ever feedeth a

milder taste.

Of Fleshes, some are edible; some, except it be in Famine, not. As

those that are not edible, the caus is, for that they have (commonly)
too much bitterness of taste; and therefore those Creatures, which are

and Cholerick. are not edible; as Lions, Wolves, Squirrels, Dogs, Foxes,

Horses, &c. As for Kine, Sheep, Goats, Deer, Swine, Conneys, Hares, &c.

We see they are milde, and fearfull. Yet it is true, that Horses which are

Beasts of courage, have been and are eaten by some Nations; as the Skythians

were called Hippoglyphi; and the Chinese eat Horse flesh at this day; and

some Gluttons have used to have Colts flesh baked. In Birds, such as are

Carnivora, and Birds of Prey, are commonly no good Meat; but the rea-
on is, that rather the Cholerick Nature of those Birds, than their Feeding up-
on Fleshes; for Puits, Gulls, Shoreeres, Ducks, do feed upon Fleish, and yet are

good.
good Meat. And we see, that those Birds which are of Prey, or feed upon Flesh, are good Meat, when they are very Young; as Hawks, Bows, out of the Nest. Owls. Mans flesh is not eaten. The Reasons are three.

First. Because Men in Humanity do abhor it.

Secondly, Because no living Creature, that dies of it self, is good to eat; and therefore the Cannibals (themselves) eat no Mans 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 they must not be overnear, or like: Yet we see, that in great weaknesses and Consumptions, Men have been tisstain'd with Woman's Milk. And 

The fourthly, for the Prolongation of Life, that a Vein be opened in the Arm of some whom young man, and the blood to be sucked. It is said, that Witches do greedily eat Mans flesh, which if it be true, besides a devilish Appetite in them, it is likely to proceed; for that Mans flesh may suck 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 power also to extinguish the fire. It must have two things, if it be true, to this operation. The one, a very close skin, whereby flame, which in the midst is not so hot, cannot enter: For we see, that if the Palm of the Hand be anointed thick with White of Eggs, and then

The other is some extreme cold and quenching virtue, in the Body of that Creature which choaketh the fire. We see that Milk quencheth Wildfire better than Water, because it ersteth better.

Time doth change Fruit (as Apples, Pears, Pomegranates, &c.) from more 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 Vinyce, &c.

The cause is, the Congregation of the Spirits together; for in both kinds, the Spirit is attenuated by Time; but in the first kind, it is more diffused, and more matted by the greater 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 caueth also more strength in the Liquor; such as if the Spirits be of the hotter sort, the Liquor becometh apt to burn; but in time, it caueth likewise, when the higher Spirits are evaporated more fomery.

That hath been observed by the Ancients, that Plates of Metal, and especially of Brass, applied presently to a blow, will keep it down from swelling. The cause is Repercussion, without Humetation, or entrance of any Body: For the Plate hath only a virtual cold, which doth not search into the hurt; whereas all Plaisters and Oyniments do enter. Surely, the cause that blows and bruises induce swellings is, for that the Spirits referring 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 caueth it; for that Gouts, and Toothachs caueth swelling, where there is no Percussion at all.
The nature of the Orris Root, is almost singular, for there be few odoriferous Roots: and in those that are in any degree sweet, it is but the same sweetness with the Wood or Leaf: But the Orris is not sweet in the Leaf, neither is the lower anything to 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 Mollifier, 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 Liquor; and that this holdeth more in Wine, than in Water. The cause may be trivial, namely, by the expence of the Liquor, in regard some may stick to the sides of the Bottles: But there may be a cause more subtile, 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 compriseth 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 moistiture not; and to all madeaction there is required an imbibition: But where the Bodies are of such several Levity, and Gravity, as they mingle not, they can follow no imbibition. 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, writeth not.

Starlight Nights, yea, and bright Moonshine Nights, are colder than Cloudy Nights. The cause is, the dryness and Finiteness of the Air, which thereby becometh more piercing and sharp; and therefore great Continents are colder than Islands. And for the Moon, though it fell inclineth the Air to moisture, yet when it thineth 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 if light, if it be not altered by that expiration, is not without some secret degree of heat; as it is not like wise without some secret degree of Light: For otherwise Cui, and Orris, could not see in the Night; but that Air hath a little Light, proportionable to the Visual 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 liquid when they will. And the common Tradition is, that if Children be set upon a Table with a Candle behind them, both Eyes will move outwards, as attending to see the Light, and so induce Squinting.

We see more exquisitely with one Eye shut, than with both open. The cause is, that the Spirits Visual unite themselves more, and so become stronger.
For you may see, by looking in a Glass, that when you shut one Eye, the Pupil of the other Eye, that is open, dilateth. 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 dimmest light; and likewise have their sight stronger near hand, than those that are not Pore-blind, and can read and write Smaller Letters. The cause is, for that the Spirits Vifual in those that are Pore-blind, are thinner and rarer, than in others, therefore the greater light disperseth them. For the same cause they need contracting; but being contracted, are more strongeth than the Vifual Spirits of ordinary eyes are; as when we see thro' a Level, the light is the stronger: And lo it is, 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 Vifual, 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 dazell, 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 laid a little while, either in the light, or in the dark. The cause is, for that the Spirits Vifual, are upon a sudden change disturb'd, 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 darknefs, they cannot dilate suddenly. And excess of both thefe, (that is, of the Dilation, and Contraction of the Spirits Vifual,) if it be long, destroyeth the Eye. For as long looking against the Sun, or Fire, hurteth the Eye by Dilation, 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 transparent, though withal it maketh both the Cheeks, 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, diverteth 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 of 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 gross enough to offend it. But the caufe (chiefly) is, for that there be no active objects to offend the Eye. For Harmonical Sounds, and Discordant Sounds, are both Active and Positive; so are sweet smells, and links; so are bitter, and sweetes, in tastes; so are over-hot, and over-cold, in touch; but blacknes, and darkness, are indeed but privatives; and therefore have little or no Activity. Somewhat they do contribute, but very little.

Water, I will mention next, as being a thing of such nature, that, when it is moved, it doth make the object seem blacker when it reflecteth; and whiter when it reflecteth. The cause is, that by means of the Motion, the Beams of Light pass not straight, and therefore must be darkned; 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 doth prove to be driven further, in trying by what means Motion may hinder Sight.

Shell-fish have been by some of the Ancients, compared and sort with the Insects: but I see no reason why they should, for that 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 indiscriminate Sex. 

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, and differently 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.

Friables make the parts more fleshly, and full: As we see both in Men, and in the Currying of Horses, &c. The cause is, for that they draw greater quantity of Spirits and Blood to the parts; and again, because they draw the Aliment more forcibly from within; and again, because they relax the Pores, and do make better passage for the Spirits, Blood, and Aliment: Lastly, because they dissipate, and digest any Inutile, or Excrementitious moisture; which lieth in the Flesh; all which help Affimilation. Friables also do, more fill and impregnate the Body, than Exercise. The cause is, for that in Friables, the inward parts are at rest; which in exercise are beaten (many times) too much; And for the same reason (as we have noted here before) Galli &c. are fat and fleshly, because they stir the Limbs more, and the inward parts less.
All Globes a 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 Shad'ows, 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 sloper rise and fall: But where there is less Water, and less space, and the Water daflheth 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 Warmth, and the like, are not bitter.

It hath been set down before, that Pits upon the Seas-shores 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 Afrike, after a time, the Water in such Pits will become brackish again. The cause is, for that after a time, the very Sands, thorow 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 les time, than Fresh Water will dissolve it. The cause may be, for that the Salt in the precedent Water, doth by similitude of Substance, draw the Salt new put in, unto it; whereby it dissolves in the Liquor more speedily. This is a noble Experiment, if it be true; for it showeth means of more quick and easie Infusions and it is likewise a good instance of Attraction by Similitude of Substance. Try it with Sugar put into Water, formerly laged, and into other Water unlaged.

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 entreath 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, put part above the Water. It is worthy the inquiry, to see how you may make more accurate Intuitions, by help of Attraction.

Water in Wells is warmer in Winter than in Summer; and so Air in Caves. The caulis 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) is the more; but if it be the same (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, by having about him with strings, at some distance, many great Bowls; and fixing into his Body divers Feathers spred, 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 tilling upon the sides. The further extension of this Experiment for Flying, may be thought upon.

Here is in some places (namely, in Cephalonia) a little Shrub, which they call Holy Oak, or Dwarf Oak. Upon the Leaves wereof there rillth a Tumor, like a Blister; which they gather, and rub out of it, a certain red dust, that converteth (after a while) into Worms, which kid with Wine, (as is reported) when they begin to quicken: With this Dust they Die Scarlet.

In Zant, it is very ordinary, to make Men impotent, to accompany with their Wives. The like is practis'd in Gascony, where it is called Nozer I' Equillere. It is practis'd 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 Baron 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 Nozer, which they call Necessum, and it proceedeth thus; the Flame of the Candle as soon, as it is covered, being suffocated by the close Air, lefthemeth by little and little: During which time, there is some little afcent of Water, but not much; for the Flame occupying less and less room, as it lefthemeth, 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 Baron: Which sheweth, that it is not the Flames drawing the Liquor, as Nourishment, as it is supposed: for all Bodies are alike
The Power of the Celestial Bodies, and what moreLECTER influences they have, besides the two manifest influences of Heat and Lights, we shall speak, when we handle Experiments touching the Celestial Bodies: Mean while, we will give some Directions for more certain Trials of the Vortices 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 Moisture; the exciting of the Motions of Spirits.

For the drawing forth of Heat, we have formerly prescribed to take Water warm, and to set part of it against the Moon-beams, and part of it with a 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 call upon them, to see whether will putrefy sooner. Try it also with an Apple or Orange, having holes made in their tops, to see whether will rot or mould sooner. Try it also with Holland Chees, having Wine put into it, whether it will breed Mites sooner or greater.

For the increase of Moisture, the opinion received is, that Seeds will grow sooneft, and Hair, and Nails, and Hedges, and Herbs, cut &c. will grow sooneft, if they be set or cut in the increase of the Moon; Also, that Brains in Rabbits, Woodcockes, Calves, &c. are fullest in the Full of the Moon; and so of Marrow in the Bones, and so of Oysters and Cockles; which of all the rest are the easiest tried, if you have them in Pits.

Take some Seeds or Roots (as Onions, &c.) and set some of them immediately after the Change; and others of the same kind immediately after the Full; Let them be as like as can be, the Earth also the same as near as may be, and therefore best in Pots; Let the Pots also stand where no Rain or Sun may come to them, let the difference of the Weather confound the Experiment. And then see in what time the Seeds fer, 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 were good for those that have moist Brains, and are great Drinkers, to take fume of Lignum Aloes, Rosemary, Frankincense, &c. about the Full of the Moon. It is like also, that the Humors in Mens Bodies increas and decrease, as the Moon doth; and therefore it were 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 increas 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 warm and rain; which would be observed.

It may be, that Children and young Cattel that are brought forth in the Full of the Moon, are stronger and larger than those that are brought forth in the 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 the better Bird; and a number of the like effects, which may be brought into observation. Quere also, whether great Thunders and Earth-quakes be not molt 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 carrieth out the more Oily Spirits, and leaveth the Liquor more sour and hard. We see also, that Burnt-Wine is more hard and astringent than Wine unburnt. It is said, that Cider in Navigations under the Line ripeneth, when Wine or Beer fowreth. It were good to set a Rundlet of Vinegar over against the Sun in Summer; as they do Vinegar, to see whether it will ripen and sweeten.

There be divers Creatures that sleep all Winter; as the Bear, the Hedgehog, the Bat, the Bee, &c. These all wax fat when they sleep, and egget not. The caule of their fastening, during their sleeping time, may be the want of assimilating; for whatsoever assimilateth not to Fireth, turneth either to sweat or fat. These Creatures, for part of their sleeping time, have been observed not to stir at all; and for the other part, to stir, but not to remove, and they get warm and close places to sleep in. When the Flemings wintered in Nova Zembla, the Bears about the middle of November went to sleep; and then the Foxes began to come forth, which durst not before. It is noted by some of the Ancients, that the She Bear-bredeth, and lieth in with her young during that time of Feath, 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 Vivification. 

Century IX.
fication is a gentle and proportionable heat, working upon a glutinous and yielding subtance; for the heat doth bring forth Spirit in that subtance, and the subtance 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 Menstruous subtance, all matter whereof Creatures are produced by Putrefaction, have evermore a Closeness, Lentor, and Secuacity. It seems therefore that the Generation by Sperm onely, and by Putrefaction, have two different causes. The first is, for that Creatures which have a definite and exact shape (as those have which are procreated by Copulation) cannot be produced by a weak and casual heat; nor out of matter, which is not exactly prepared according to the Species. The second is, for that there is a greater time required for Maturation of perfect Creatures; for if the time required in Vivification be of any length, then the Spirit will exhale before the Creature be mature; except it be inclosed in a place where it may have continuance of the heat, access of some nourishment to maintain it, and closeness 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 closeness be commonly required. As for the Heathen opinion, which was, That upon great mutations of the World, perfect Creatures were first engendred 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; in so much, 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 Dryn besides) but only the Soul, or potential 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 Transmigration throughout the whole Body: So that by this they did inculcate, that no distance of place, nor want of improvement 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 only, by the co-operation of Angels or Spirits, but only by the Unity and Harmony of Nature. There were some also that held not here, but went further, and held, That if the Spirit of Man (whom they call the Microcosm) do give a fit touch to the Spirit of the World, by strong Imaginations and 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 vast and bottomless Follies Men have been (in part) entertained.
Nature and for Experiment and believe in it. For a

who, but the Works of God, and to the Sense, which

is God's Lamp, (Luc via Dei Spiraculum Humin) will enquire with all Sobriety and Severity, whether there be to be found in the Foot-steaps of Nature any such Transmission and Influx of Immateiate Virtues; and what the force of Imagination is, either upon the Body Imaginative, or upon another Body: Wherein it will be like that labor of Hercules in purging the Stable of Augea, to separate from Superstitious and Magical Arts and Observations, any thing that is clean and pure Natural, and not to be either condemned or condemned. And although we shall have occasion to speak of this in more places then one, yet we will now make some entrance thereinto.

MEN are to be admonished, that they do not withdrau credit from the Operations by Transmission of Spirits and Force of Imagination, because the effects fail sometimes. For as in Infection and Contagion from Body to Body, (as the Phlegm, and the like) it is most certain, that the Infection is received (many times) by the Body Passive, but yet is by the strength and good disposition thereof repulsed; and obtained, before it be formed into a Disease, so much more in Impressions from Minde to Minde; or from Spirit to Spirit, the Impression taketh, but is encountered and overcome by the Minde and Spirit, which is Passive, before it work any manifest effect: And therefore they work most upon weak Minds and Spirits; as those of Women, Sick Persons, Superstitious and fearful Persons, Children, and young Creatures.

Neque quis seremus oculus mihi satis ex Agnos:
The Poet speaketh not of Sheep, but of Lambs. As for the weakens 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 weakens of the Imagination of the Imaginant; for it is hard for a Witch or a Sorcerer to put on a belief, that they can hurt such persons.

Men are to be admonished on the other side, that they 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 Plant or 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 pestilential, 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 Minds; and the state of Humane Actions is so variable, that to try things oft, and never to give over, doth wonders: Therefore it were a meer falacy and mistaking to ascribe that to the Force of Imagination upon another Body, which is but the Force of Imagination upon the proper Body; for there is no doubt but that Imagination and vehement Affection work greatly upon the Body of the Imaginant, as we shall shew in due place.

Men are to be admonished, that as they are not to mistake the causes of these Operations, so much less they are to mistake the Fact or Effect, and rashly to take that for done which is not done. And therefore, as divers wise Judges have prescribed and cautioned, Men may not too rashly believe
believe the Confession of Witches, nor yet the evidence against them: For the Witches themselves are Imaginative, and believe o'times they do that which they do not; and people are credulous in that point; and ready to impute Accidents and Natural operations to Witchcraft. It is worthy the observing, that both in ancient and late times, (as in the heathen Witches, and the meetings of Witches that have been recorded by so many late Confessions) the great wonders which they tell of carrying in the Air, transforming themselves into other Bodies, &c. are still reported to be wrought, not by Incantation or Ceremonies, but by Ointments and Anointing themselves all over. This may justly move a Man to think, that these Fables are the effects of Imagination; for it is certain, that Ointments do all (if they be laid on any thing thick) by stopping of the Pores, that in the Vapor, and send them to the head extremely. And for the particular Ingredients of those Magical Ointments, it is like they are opiate and soporiferous. For Anointing of the Forehead, Neck, Feet, Back-bone, we know is used for procuring deep sleep. And if any Man say, that this effect would be better done by inward potions; answer may be made, that the Medicines which go to the Ointments are so strong, that if they were used inwards, they would kill those that use them; and therefore they work potently, though outwards.

We will divide the several kindes of the operations by transmission of Spirits and Imagination, which will give no small light to the Experiments that follow. All operations by transmission of Spirits and Imagination have this, that they work at distance, and not at touch; and are these being distinguished.

The first is, The Transmission or Emision of the thinner and more airy parts of Bodies, as in Odors and Infections; and this is, of all the rest, the most corporeal. But you must remember withal, that there be a number of those Emisions, both unwholesome and wholesome, that give no smell at all: For the Plague many times when it is taken giveth no-feint at all, and there be many good and healthfull Airs, as they appear by Hibration, and other proofs, that differ not in Smell from other Airs. And under this head you may place all Imbitions of Air, where the substance is material, odor-like, whereas some nevertheless are strange, and very suddenly diffused; as the alteration which the Air receiveth in Egypt almost immediately upon the rising of the River of Nilus, whereas we have spoked.

The second is, the Transmission or Emision of those things that we call Spiritual Species, as Visible and Sounds; the one whereof we have handled, and the other we shall handle in due place. These move swiftly and at great distance, but then they require a Medium well disposed, and their Transmission is easily stopped.

The third is, the Emisions 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 Elektrick Bodies, and the Attraction in Gold of the Spirit of Quick-silver at distance, and the Attraction of Heat at distance, and that of fire to Raphides, 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 Emulsion of Spirits, and Immateriæate Powers and Virtues, in those things which work by the universal configuration and Sympathy of the World; not by Forms, or Celestial Influxes, (as is vainly taught and received) but by the Primitive Nature of Matter, and the seeds of things. Of this 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 Immateriæate Virtues have this property differing from others, that the diversity of the Medium hindreth them not, but they pass through all Mediums, yet at determinate distances. And of these we shall speak, as they are incident to several Titles.

The fifth is, the Emulsion 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 influx 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 Precept; and it is this, That if you desire to super-induce any Virtue or Disposition upon a Person, you should take the Living Creature, in which that Virtue is most eminent and in perfection; of that Creature you must take the parts wherein that Virtue chiefly is collocate. Again, you must take the parts in the time, and act when that Virtue is most in exercise, and then you must apply it to that part of Man, wherein that Virtue chiefly confliteth. As if you would super-induce Courage and Fortitude, take a Lion, or a Cock; and take the Heart, Teeth, 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 wrifit. Of these and such like Sympathies we shall speak under this present Title.

The eighth and last is, an Emulsion of Immateriæate 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 Vagnantium Telis, and so of a piece of Lard, or flick of Elder, &c. That if part of it be consumed or purrified, it will work upon the other parts severally. Now we will pursue the instances themselves.
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 Anisides, either inward (as Mischridases, Juniper-berries, Rce, Leas, and Seed, &c.) or outward (as Angelica, Zedoary, and the like in the Month; 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 nattily kept; whereof 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 busines, or were present, sunk, upon it, and died. Therefore it were good wildom, that in such cases the Goal were aired before they be brought forth.

Out of question, if such foul smells be made by Arts, and by the Hand, they confit chiefly of Mams flesh, or sweat, purfified; for they are not those thinkes which the Nostrils straight abhor and expel, that are most pernicious, but such Airs as have some similitude with Mans body, and so infaute 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 Assemblies, at Plays and Solemnities, and the like: For poisons of Air is no less dangerous, then poisoning of Water, which hath been used by the Turks in the Wars, and was used by Emanuel Commensus towards the Christians, when they passed through his Countrey to the Holy Land. And these empoisonsments 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 was good those publick places were perfumed before the Assemblies.

The empoisonment of particular perions by Odors, hath been reported to be in perfumed Gloves, or the like. And it is like they mingle the poison that is deadly with some smells that are sweet, which also maketh it the sooner received. Plagues also have been raised 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 Anisides to save themselves; so that men ought not to be secure of it.

There have been in divers Countreys great Plagues by the purfication of great Swarms of Grasshoppers and Locusts, when they have been dead and call upon heaps.

It happeneth oft in Moons, that there are Damps which kill either by Suffocation, or by the poysont nature of the Minerals; and those that deal
Natural History;

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
poyson Birds (as is said) which flye over them, or Men that stay too long
about them.

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 stealthily on by little and little, inducing only faintness, without any
manifest strangling. When the Dutchmen wintered at Nova Zembla, and
that they could gather no more flocks, they fell to make fire of some Sea-
coal they had, wherewith (at first) they were much refreshed; but a little
after they had fatten 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 insufflation of the Air, and so of the
Breath and Spirits. The like enfluenz in Rooms newly Plaistered, if a fire
be made in them; whereof no less Men then the Emperor Tavorinus
died.

Vide the Experiment 803. Touching the Infectious Nature of the Air upon
the first Showers after long Drought.

It hath come to pass, that some Apothecaries, upon tasting of Colo-
quiniida, have been put into a great Scouring by the Vapor only.

It hath been a practice to burn a Pepper they call Guinny-Pepper, which
hath such a strong Spirit, that it provoketh a continual Sneezing in those that
are in the Room.

It is an Ancient Tradition, that Bear Eyes infect Sound Eyes; and that a
Menstruous Woman looking in a Glass doth ruffle it: Nay, they have an opinion,
which seemeth fabulous. That Menstruous Women going over a Field or Garden,
do Corn and Herbs good by killing the Worms.

The Tradition is no less ancient, that the Basilisk killeth by aspect; and
that the Woolf, if he seeth a Man first, by aspect killeth a Man hoarly.

Perfumes convenient to dry and strengthen the Brain, and stay Rheums and
Defluxions as we finde in Fume of Rosemary dried, and Lignum Albus,
and Calamus taken at the Mouth and Nostrils. And no doubt, there be other
Perfumes that do moisten and refresh, and are fit to be used in Burning Agues,
Consumptions, and too much wakefulness; such as are Rose-water, Vinegar,
Lemon-pills, Violets, the Leaves of Vines sprinkled with a little Rose-water,
&c.

They do use in sudden Fainting 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.

Tobacco comforteth the Spirits, and dischargeth weariness; which it
worketh, partly by opening, but chiefly by the opiate virtue, which con-
dengeth the Spirits. It were 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 Albus, before mentioned in Pipe, and so of Nutmegs and Folium
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 sow Barley. But because Ploughing is tied to Saffrons, 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 Saffrons; which is ever the early Spring, before the Earth puttheth forth the Vegetables, and in the sweetest Earth you can chufe. 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 Cloth 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 new 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 *Physic* 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 *Melanchium*, *Annum*, &c.

There be two things which (inwardly used) do cool and condense 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 *Cwo*, are thought to further Venereal Appetite; which they may do by the refreshing and calling forth of the Spirits.

Incense and Nderous 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 contritation of the Spirits, and partly also by Heating and Exalting them. We see that amongst the Jews, the principal perfume of the Sanctuary was forbidden all common uses.

There be some Perfumes prescribe by the Writers of *Natural Magick*, which procure pleasant Dreams; and some others (as they say) that procure Prophetical Dreams, as the Seeds of *Flax*, *Fleawort*, &c.

It is certain, that *Odors* do in a small degree, nourish, especially the Odor of Wine; and we see Men an hungrued 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 she much desired to see) because there would be a Corps in the House: Whereupon he caused Loaves of new Bread to be sent for, and opened them, and poured a little Wine into them, and so kept himself alive with
the Odor of them till the Feast was past. I knew a Gentleman that would last (sometimes) three or four, yea, five days, without Meat, Bread, or Drink; but the same Man used to have continually a great Wilp of Herbs that he smelled on, and amongst those Herbs some excellent Herbs of Strong Eint, as Onion, Gallick, 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 riling 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 ficknesses, 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 Pestilent Airs; which was accounted a great cause of the wholesome Air of Amiens. There be also some Soys that put forth Odorate Herbs of themselves, as Wild Thyme, Wild Myrjoram, Penny-royal, Camomile; and in which, the Bryan-Rofer smell almost like Musk-Ros;, which (no doubt) are signs that do discover an excellent Air.

It were good for men to think of having healthful Air in their Hous; 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 freth; and the other, maketh it exceeding unequal, which is a great enemy to health. The Windows also should not be high up to the Roof (which is in use for Beauty and Magnificence) but low. Also Stone-walls are not wholesome; but Timber is more wholesome, and especially Brick; nay, it hath been used by some with great success, to make their Walls thick, and to put a Lay of Chalk between the Bricks to take away all dampnnesses.

These Emiissions (as we said before) are handled, and ought to be handled by themselves, under their proper Titles; that is, Visible, and Audible, each apart: In this place, it shall suffice to give some general Observations common to both. First, they seem to be Incorporeal. Secondly, they work twofold. Thirdly, they work at large distances. Fourthly, in curious varieties. Fifthly, they are not effective of anything, nor leave any work behind them, but are energies merely; for their working upon mirrors and places of Echo doth not alter any thing in those Bodies; but it is the same Action with the Original, only repercurred. And as for the shaking of Windows, or rarifying the Air by great noises, and the Heat caused by Burning Glases, they are rather Concomitants of the Audible and Visible Species, than the effects of them. Sixthly, they seem to be of so tender and weak a Nature, as they affect only such a Rare and Attenuate Substance as is the Spirit of Living Creatures.

It is mentioned in some Stories, that where Children have been exposèd 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 Aniusius believe, that his genius (which otherwise was brave and confident) was, in the presence of Othoianus Caesar, 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 subsorbed 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 set and ill dis-
poised; and contrariwise, that others that are of a jovial nature do dispo-
s 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 Ortieus, &c.

Audacity and confidence doth, in civil businesses, so great effect, as a
Man may (reasonably) doubt, that besides the very daring, andearnestness,
and pressing, and importunity, there (should be some secret binding and
flooding 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 Oculi 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 Spirits of the person loved, which causeth the desire
return into the Body whence it was emitted, whereupon followeth that appetite
of contract and conjunction which is in Lovers. And this is observed
likewise, that the Affection that procure Love, are not gazings, but sudden
glances and dartings of the Eye. As for Envy, that emitteith some malign
and poisonous Spirits, which take hold of the Spirit of another; and is likewi-
se of greatest force, when the Call of the Eyes is oblique. It hath been no-
told also; That it is most dangerous, where the envious Eye is cast upon per-
sons 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 to 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 caufed 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 blufh 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 under-
stand to be the representation of an Individual Thought. Imagination is of
three kinds; the first, join'd with Belief of that which is to come; the se-
cond, join'd 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;

as if one should imagine such a Man to be in the Vestments of a Pope, or to have Wings. I single out for this time that which is with Faith or Belief of that which is to come. The Inquisition of this Subject in our way (which is by Induction) is 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 kindes. The first, upon the Body of the imaginar, 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 oneonly 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 self. And here again we must wary distinguishing; for it is not meant (as hath been partly said before) that it should help by making a man more flour, or more inductious; (in which kindes, 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 experiment; 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 reprehendeth that other 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 joyned with a Belief, that his Imagination may procure it.

For example, I related one time to a Man that was curious and vain enough in these things, That I saw a kind of Jugler that had a Pair of Cards, and would tell a man what Card he thought. This pretended Learned Man told me, it was an unmakiing 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 a stronger, that he could think no other Card. And thereupon he asked me a Question or two, which I thought I did but cunningly, knowing before what usef of to be the fears of the Jugler. Sir, (said he) do you remember whether he told the Card, the Man thought himself, or had another to tell it? I answered, (as was true) That he had 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 Jugler was some strange man, and could do strange things) that other man caught a strong Imagination. I hearkned unto him, thinking for a vanity he spake prettily. Then he asked me another Question: Saith he, Do you remember whether he had the Card first, and afterwards told the other? May in his Ear what he should think; or else, that he did whisper first in the Man's 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 imagin- ing 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 confedacy between the
\textit{Jugler, and the two Servants}; though (indeed) I had no reason so to think, for
they were both my Fathers Servants, and he had never plaid in the House
before. The Jugler also did cause a Garter to be held up, and took upon
him to know that such an one should point in such a place of the Garter, as
it should be near so many inches to the longer end, and so many to the shorter;
and still he did it by first telling the imaginer, and after bidding the actor
think:

Having told this Relation, not for the weight thereof, but because it
doeth handomly open the nature of the Question, I return to that I said,
That \textit{Experiments of Imagination} must be praftied by others, and not by a Mans
felf. For there be three means to fortifie Belief: the firft is Experience, the
fecond is Reafon, and the third is Authority. And that of these which is
far the moft potent, is Authority: For Belief upon Reafon or Experience
will flagger.

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 him-
felf; but for Belief in a Man, it muft be by another. Therefore if a Man be-
lieve in Astrology, and finde a figure prosperous; or believe in Natural Ma-
gick, 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 howfoever all Authority muft be out of a Mans
felf, turned (as was said) either upon an Art, or upon a Man; and where
Authority is from one Man to another, there the fecond muft be Ignorant,
and not learned, or full of thoughts: And such are (for the moft part) all
Witches and superstitious persons, whose beliefs, tied to their Teachers and
Traditions, are no whit controlled either by Reafon or Experience: And
upon the fame reafon, in Magick they use (for the moft part) Boys and young
People; whose spirits easieft 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 Imagi-
nation; and Means to repeat it and refresh it.

For the Authority we have already spoken. As for the fecond, namely,
the Means to quicken and corroborate the Imagination, we see what hath been
used in Magick, if there be in those practices any thing that is purely Na-
tural as Vellmints, Characters, Words, Seals, some parts of Plants, or Li-
ving Creatures, Stones, choice of the Hour, Gestures and Motions; also In-
centes and Odors, choice of Society, which increafeth Imagination, Diets and
Preparations for some time before. And for Words, there have been
ever used, either barbarous words of no sense, lest they should disturb the
Imagination; or words of similitude, that may fecond and feed the Imagi-
nation: 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 strenghten the Imagination. And for
the fame reafon He brew 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 purrifice by little and little, or the like: For so oft as the
Imaginist doth think of thole things, so oft doth he represent to his Imagina-
tion the effect of that he desirith.
Natural History;

950. 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 all distances, or through all Mediums, or upon all Bodies; but that the distance must be considerable, the Medium not adverse, and the Body apt and proportionate. Therefore if there be any operation upon Bodies in abscence by Nature, it is likely to be conveyed from Man to Man, as Fame is: As if a Witch by Imagination should hurry any afar off, it cannot be naturally, but by working upon the Spirit of some that cometh to the Witch and from that party upon the Imagination of another, and so upon another, till it come to one that hath resort to the 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 less credit to be given to those things, except it be by working of evil spirits.

The Experiments which may certainly demonstrate the power of Imagination upon other Bodies, are few or none; for the Experiments of Witchcraft are no clear proofs, for that they may be by a tacit operation of malign Spirits; we shall therefore be forced in this Inquiry, to refer 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 laid till we had made Experiments of some of them our selves, (as we do commonly in other Titles) the truth is, that these Effects of Imagination upon other Bodies, have to little credit with us, as we shall try them at leisure: But in the mean time we will lead others the way.

951. 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.

952. It were good, because you cannot discern fully of the strength of Imagination in one Man, more then another, that you did use the Imagination of more then 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 Matter shall surely recover.

953. The Imagination of one that you shall use (such is the variety of Mens minds) cannot be always alike constant and strong; and if the success follow not speedily, it will faint and lose its strength. To remedy this, you must pretend to him whose Imagination you use several degrees or 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 Matter shall recover, but it will be fourteen days ere he findeth it apparently, &c. All this to entertain the Imagination, that it waver less.

954. It is certain, that potions or things taken into the Body, Incenfes 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 Receipt for the Work which he desireth, that he do take such a Pill, or a spoonful 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 gross or muddy, whereby the imagination will fix the better.

The body passive, and to be wrought upon, (I mean not in 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 Aristotle's Phyllics, 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's 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 the 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 lust, which is ever with imagination upon men in fear, or men in irresolution, and the like: Whatever 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 thread in a glass, and telling him that holdeth it before, that it shall strike to many times against the side of the glass, and no more; or of holding a key between two men's fingers without a charm; and to tell thosethat 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 merely 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 murdered be brought before the murderer, the wounds will bleed afresh. Some do affirm, That the dead body, upon the presence of the murderer hath opened the eyes; and that there have been such like motions as well where the party murdered hath been strangled or drowned, as where they have been killed by wounds. It may be that this participateth of a miracle, by God's just judgment, who usually brings murderers to light. But if it be natural, it must be referred to imagination.

The tying of the point upon the day of marriage, to make men impot-
Here 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 content upon the Spirits of Men, to comfort and exhilarate them. Those that are the best for that effect, are the Diamond, the Emerald, the Jachim Oriental, and the Gold-stone, which is the yellow Topaz. As for their particular Proprieties, there is no credit to be given to them. But it is manifest, that Light above all things, excelleth in comforting the Spirits of Men; and it is very probable, that Light varied doth the same effect with more novelty. And this is one of the causes why Precious Stones comfort. And therefore it were good to have Tinted Lanterns, or Tinted Skreens of Glass coloured into Green, Blue, Carmine, Crimson, Purple, &c. and to use them with Candles in the night. So likewise to have round Glasses, not onely 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 Paris-work, Looking Glasses, bordered with broad Borders of small Crystal, and great counterfeit Precious Stones of all Colours, that are most glorious and pleasaunt to behold, especially in the night. The Pictures of Indian Feathers are likewise comfortable and pleasaunt to behold. So also fair and clear Pools do greatly comfort the Eyes Spirits, especially when the Sun is not glaring but overcast, or when the Moon shineth.

Therebe divers sorts of Bracelets fit to comfort the Spirits; and they be of three Intentions; Refrigerans, Corrborans, and Aperient. For Refrigerans I with them to be of Pearl, or of Coral, as is used. And it hath been noted that Coral, if the party that weareth it be ill disposed, will wax pale; which I believe to be true, because otherwise distemper of heat will make Coral lose colour. I commend also Beads or little Plates of Lapis Lazuli, and Beads of Nitre, either alone, or with some Cordial mixture.

For Corroboration and Confortation, take such Bodies as are of Astringent quality without manifest cold, I commend Bead-Amber, which is full of Affection, but yet unsatious, and not cold, and is conceived to impingnate those that wear such Beads. I commend also Beads of Harte-Horn and Ivory, which are of the like nature: also Orange-Beads, also Beads of Lignum Aloea, macerated first in Rose-water and dried.

For opening, I commend Beads, or pieces of the Roots of Cardamum Benedictus; also of the Roots of Peony the Male, and of Orran, and of Calamus Aromaticus, and of Rew.

The Cramp (no doubt) cometh of contraction of Sinews; which is manifest in that it cometh either by cold or drinjes, as after Consumptions and long Agues: for Cold and Drinjes do (both of them) contract and corragare. We see also, that chafing a little above the place in pain, easeth the Cramp; which is wrought by the Dilatation of the contracted Sinews by heat. There are in use for the prevention of the Cramp, two things: 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 aileth to come. I do finde this the more strange, because neither of these have any Relaxing Virtue, but rather the contrary. I judge therefore that their working is rather upon the Spirits within the Nerves to make them strive less, then upon the Bony substance of the Nerves.

I would have trall made of two other kinds of Bracelets for comforting the Heart and Spirits. The one of the Trochile of Vipers made into little pieces of Beads; for since they do great good inwards (especially for pestilent Agues) it is like they will be effectual outwards, where they may be applied in greater quantity. There would be Tichishefs 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 Kerrus, which is the principal Ingredient in their Cordial-Confession Alkermen. The Beads would be made up with Amber-Griese, and some Pomander.

It hath been long received, and confirmed by divers tralls, that the Root of the Male-Peony dried, tied to the Neck, doth help the Falling-sickness; and likewise the Incusus, which we call the Magic. The caufe of both these Diseases, and especially of the Epilepsie from the Stomack, is the grofnes of the Vapors which rise and enter into the Cells of the Brain: And therefore the working is by extream and subtill Attenuation, which that Simplices hath. I judge the like to be in Caslorem, Musk, Ren-Seed, Agave Castus 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. Quere, if the Stone taken out of the Toads Head, be not of the like virtue, for the Toad loveth Shade and Coolness.

Light may be taken from the Experiments of the Hoste-tooth Ring, and the Garland of Periwinkle, how that those things which affligue the Brave of the Spirits, do help diseases, contrary to the Intention deigned; for in the curing of the Cramp, the Intention is to relax the Sinews; but the contraction of the Spirits, that they strive less, is the best help: So to procure galle Travails 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 wife helpeth. So in Pestilent Fever, the Intention is to expel the Infection by Sweat and Evaporation; but the best means to do it, is by Nitre, Diphosphuridum, 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 came to quench the Fire of an House; which are so busie, 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 preserving of Health. I doubt it is but a conceit; for that the Snake is thought to renew her youth by calling 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 ancientsly received, (for Pericles the Athenian used it) and it is yet in use, to wear little Bladders of Quick-silver, or Tabless of Arsenick, as preservatives against the Plague: Not as they conceive, for any comfort they yield to the Spirits; but for that being poylons themselves, they draw the venom to them from the Spirits.
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971. Vide the Experiment 95, 96, and 97. touching the several Sympathies and Antipathies for Medicinal use.

972. 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 Digestion; 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 Wolf, whole, dried and hanged up in a Dove-bushe, will scare away Vermin, such as 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 than Wolves.

973. The Brains of some Creatures, (when their Heads are rostted) taken in Wine, are said to strengthen the Memory; as the Brains of Hares, Brains of Hens, Brains of Deer, &c. And it seemeth to be incident to the Brains of those Creatures that are fearful.

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, Woolf-bane, and Cinquefoil, mingled with the Meal of Fine Wheat. But I suppose, that the Soporiferous Medicines are likely to do it; which are Henbane, Helmlock, Mandrake, Moonshade, Tobacco, Opium, Saffron, Poplar leaves, &c.

974. 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 Wolf moveth itching; that an lone 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 Child, 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 Child's ingeniosity: And on the contrary side, if the Mother eat (much) Onions or Beans, or such vaporous food, or drink Wine or strong drink immoderately, or fast much, or be given to much muling, (all which send or draw vapours to the Head) it indangereth the Child to become Lunatick, or of imperfect memory: And I make the same judgment of Tobacco oftentaken by the Mother.

The Writers of Natural Magic report, that the Heart of an Ape worn near the Heart, commeth the Heart, and increaseth audacity. It is true, that the Apeis a merry and bold Beast. And that the same Heart likewife of an Ape applied to the Neck or Head, helpeth the Wit, and is good for the Falling sickness. The Ape also is a witty Beast, and hath a dry Brain; which may be some caufe 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 mindesto use it; except it be in such as wear the Reliques of Saints.

975. The Flesh of a Hedghog dressed and eaten, is said to be a great dryer. It is true, that the Juice of a Hedghog must needs be harsh and dry, because it putteith 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 Fufula's.

Mummy hath great force in stanching of Blood; which as it may be ascribed to the mixture of Balms 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 dregs or powder of Blood, fevered 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 lopping 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 leemeth, 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 Conch Brandes have upon the watry parts of the Body, as Urine and Hydroplical Water. And it is a good rule, That whatsoever hath an operation upon certain kinds of Matters, that in Mans Body worketh most upon those parts wherein that kind of matter aboundeth.

Generally that which is Dead, or Corrupted, or Excrened, hath antipathy with the same thing when it is alive, and when it is found, and with those parts which do excren: As a Carcass of Man is most infectious and odious to Man, a Carcass of any Horse to an Horse, &c. Purulent matter of Wounds and Ulcers, Carbuncles, Pox, Scabs, Leprosie, to found Flesh; and the Excrements of every Species to that Creature that excreneth them. But the Excrements are less pernicious then the corruptions.

It is a common experience, That Dogs know the Dog-killer, when as in times of Infection some petty fellow is sent out to kill the Dogs; and that though they have never seen him before, yet they will all come forth, and bark, and 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, Nurse-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 Plaited 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 Childe 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 Comines (a grave Writer) reporteth, That the Archbishop of Visena (a Reverend Prelate) laid (one day) after Mass to King Lewis the Eleventh of France, Sir, Your Mortal Enemy is dead; what time, Charles Duke of Burgundy was slain at the Battle of Granfon against the Switzers. Some trvallalfo would be made, whether Pad 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
should pray one for another, or should put on a ring or Tablet one for another like; whether, if one of them should break their Vow and Promise, the other should have any feeling of it in abstinence.

If there be any force in Imagination and Affections of singular Persons, it is probable the force is much more in the Joyne-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 concerned, because of the great joy or grief that many men are possessed with at once? Pria Quinque, at the very time when that memorable victory was won by the Christians against the Turks, at the Naval Battel of Aegina, being then hearing of Caules in the Consistory, brake off suddenly, and said to those about him, It is now more than time we should give thanks to God for the great victory he hath granted us against the Turks. It is true, that Victory had a Sympathy with his Spirit, for it was meerly his work to conclude the League: it may be that Revelation was Divine. But what shall we say then to a number of Examples amongst the Grecians and Romans, where the People being in 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 Superstition; 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 Trials 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 prescrib'd) for binding 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 fortify 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 slower, 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 the working of Beer, when the Barm is put in; or upon the coming of Butter or Cheese, after the Churning, or the Rennet being put in.

It is an ancient Tradition, every where allaged, for example of secret Proprieties and Influxes, That the Torpedo Marina, if it be touched with a long stick, doth stupefy the hand of him that toucheth it. It is one degree of working
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 immaterial Virtue and Vigor into the part levered. So much may betive, that any part taken from a Living Creature newly slain, may be of greater force, then if it were taken from the like Creature dying of itself: because it is fuller of Spirit.

Trypt 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 putrefy, to see whether it will decay the rest of the Sticks; or if you should cut off part of the Tail, or Leg of a Dog, or a Cat, and lay it to putrefy, 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 consume, 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 sundry 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 lain so long doth yet stick with me. They say the like is done by rubbing of Warts with a green Elder-stick, and then burying the stick to rot in muck. It would be tried with Corns and Wens, and such other Excrences: I would have it also tried with some parts of Living Creatures that are nearest the nature of Excrences; as the Combs of Cocks, the Spots 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 consume, to see whether it will work any effect towards the Consummation 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 fell. 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
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strangeft and hardest to come by, are the Moths 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 have expected 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 Moths, 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 staunch blood, as also the Moths hath. And the description of the whole Oyntment is to be found in the Chymical Dispensatory of Grotius.

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 bledeth, the anointing of that Instrument will serve and work the effect. This I doubt should be a device to keep this strange form of Cure in request and use, because many times you cannot come by the Weapon it self. Seventhly, the Wound must be at first washed clean with White-wine, or the parties own Water, and then bound up close in fine 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 virtue 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 subjected the matter to an easie tryal.

I Would have Men know, that though I reprehend the easie passing over of the causes of things, by ascribing them to secret and hidden virtues and proprieties (for this hath arrested and laid asleep all true Inquiry and Indications;) yet I do 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 only 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 Chalmepsis, 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 delight which Men have in Popularity, Fame, Honor, Submission, and Subjection of other Men's 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, Subjection and Tyranny; as is seen in great Conquerors and Troublers of the World, and yet more in Arch-Hereticks, for the introducing of new Doctrines, is likewise an affection of Tyranny over the Understandings and Beliefs of Men.
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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.
   a. Of Manchet, about three Ounces, the Crum only, 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.
   a. 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 renewed seven times; all in the space of a quarter of an hour or little more.

3. The Plaister.
   a. Emplastrum Diaealceithos, 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 Touched 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. Neivly put forth in the Year, 1661. By the former Publisher.

LONDON, Printed for William Lee at the Turks-head in Fleetstreet, 1669.
ARTICLES
OF
ECONOMY

ENGLISH
MEASURES

MISERABLES

FRANCIS BACON

THREE YEARS WORK

A TRAVELOVER

NEARLY TWO THOUSAND YEARS

HARVARD UNIVERSITY PRESS

Cambridge, Massachusetts

1969
ARTICLES
OF
ENQUIRY,
TOUCHING
METALS & MINERALS.

The first Letter of the Alphabet is, the Compounding,
Incorporating, or Union, of Metals or Minerals.
With what Metals, Gold will incorporate, by Simple
Colliquaufactions, and with what not? And in what
quantity it will incorporate? and what kind 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 Bras.
Gold with Iron.
Gold with Tin.

So likewise of Silver.
Silver with Quick-silver.
Silver with Lead.
Silver with Copper.
Silver with Bras.
Silver with Iron.
Silver with Tin.
What are the Compound Metals, which are common, and known? And what are the Proportions of their mixtures? As Lattin of Bras, 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 Bras, and the Calaminar-stone. As all the Mettals 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 Allays of Gold, and Silver Coyn.

Upon the Compound Body, three things are chiefly to be observed. The Colour, the Fragility or Plianthes, the Volatility or Faxation, 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 have more in the price, then it will lose in the dignity of the use. As for example, consider the price of Brass Ordnance; consider again the price of Iron Ordnance; and consider, wherein the Brass Ordnance doth excel the Iron Ordnance in use. Then if you can make a Compound of Brass and Iron Ordnance, 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 alike, 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 left the ancient Eleum, which was a mixture of Silver with Gold; whereas, I conceive, there may be much use both in Coin, Plate, and Gilding.

It is to be noted, that there is in the Version 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 villainy; 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 Imbibition, Metals will receive from Vegetables, without being dissolved might be inquireth. As when the Armorers make their Steel more tough and pliant, by the aspersion of Water, or Juyce of Herbs: When Gold being grown somewhat churlish by recovering, is made more pliant by throwing in shreds of Tanned Leather, or by Leather oyled.

Note, that in these, and the like shews of Imbibition, 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 Imbibition 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 Colliquation, for the better discovery of the Nature: And Confects and Difflets 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 Colliquations.

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 midst, and the like.

Note, that the Difflets of the Menstrua, or Strong-waters, may hinder the Incorporation, as well as the Difflets of the Metals themselves: Therefore where the Menstrua are the same, and yet the Incorporation followed not, you may conclude, the Difflet 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 Dross, which we call Refining. The second is, The drawing one Metal or Mineral out of another, which we may call Extrading. The third, The separating of any Metal into its 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 sake charge, in the Refining.

The means of this is in three manners; that is to say, In the Blast 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 quickning of the Blast, and the multiplying of the Heat in the Furnace, may be the same 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 resistance, then the same quantity in the Active will add force.

For Extrading, you are to enquire what Metals contain others, and likewise what not? As Lead, Silver, Copper Silver, &c.

Note, although the charge of Extrading 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 Extrading, or a kind of Conversion by the Fire, it is diligently to be enquired, What Salts, Sulphur, Vitriol, Mercury, 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 Arborescence.  
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 Tincting Silver yellow, Tincting Copper white, and Tincting red, green, blew, especially with keeping the lustre.

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, Brass into green, which they call Verdigris, &c.

For Calcination, to enquire how every Metal is calcined? And into what kinde of Body? And what is the exquisitest 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 is turned into Glass? and when the Metal doth but hang in the Glassy part? allo what weight the vitrified Body bears, compared with the crude Body? Also because Vitriication is accounted, a kind 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 Menstruum 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 or 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 kind 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 Ufe: 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 givelight towards the other.

For tough and brittle, they are much of the same kind with the two former, but yet worthy of an Inquiry apart: Especially to join 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 stupified. So of Volatility, the utmost degree is, when it will flee away without returning: The next is, when it will flee up, but with easie return: The next, when it will flee upwards, over the Helm, by a kind of Exultation, without Vaporing.
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Received some Months 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

Of Royal and Excellent

LIFE & DEATH

Of the Providence of the

Written in Latin by the Right Honorable

Francis Lord North

Viscount St. Albans

LONDON

Printed for W. Millan at the Three-Head

in Fleet-street. 1762.
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 stile 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.
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 fordidness of Cures, neither be honored for Necessity only, but that they will become Coadjuitors 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 Garments (I mean those of our frail Bodies) little worn or impaired.

FR. ST. ALBANS.
The History of Life and Death.

The Preface.

It is an ancient saying and complaint, That Life is short and Art long; wherefore it behoveth us, who make it our chiefest aim to perfect Art, to take upon us the consideration of Prolonging Man's Life, GOD, the Author of all Truth and Life, prospering our Endeavors. For though the Life of Man be nothing else but a mel and accumulation of sins and sorrows, and they that look for an Eternal Life set but light by a Temporary: Yet the continuation of Works 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 fo 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 Chymical 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 Inconvenience of old Age. Nevertheless the last act of Death, and the very extinguishing of Life itself, which may to 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 Treatise; but we reserve that for the last place.

That which may be repaired by degrees, without a total waste of the first flock, is potentially eternal, as the Vernal Fire. Therefore when Physicians and Philosophers saw that living Creatures were nourished and their Bodies repaired, but that this did last only for a time, and afterwards came old age, and in the end dissolution; they sought Death in somewhat which could not properly be repaired, supposing a Radical Mortality incapable of solid reparation, and which, from the first infancy, received a prosperous addition, but no true reparation, whereby it grew daily worse and worse, and, in the end, brought the bad to none at all. This conceit of theirs was both ignorant and vain; for all things in living Creatures are in their youth repaired entirely; nay, they are for a time increased in quality, 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 difficulty and to their loss; so as from that time the Bodies of Men begin to endure the torments of Mercurius, 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, Flesh, and Fat are, even after the decline of years, easily repaired; but the drier and more porous parts (as the Membranes, all the Membranes, the Sinews, Arteries, Veins, Bones, Cartilages, most of the Bowels, in a word, almost all the Organical Parts) are hardly repairable, and to their loss. 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 pass, 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 Spirit, like a gentle flame, continually preying upon Bodies, conspiring 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 Waffe 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 Bodie 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 Bodie 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 repaire 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't, inquire 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 as in a Brief or Summary only.

Also inquire diligently of Defecation, Arefellation, 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, Arefellation, and Consumption, and of the Confection of Bodies, in their proper place; and again, of the Interception, Emission, 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 Principal in this Inquisition, but serve only to give light to the Prolongation and Instauration of Life in Living Creatures. In which (as was said before) the same things come to pass, but in a particular manner. So from the Inquisition touching Bodies Inanimate and Vegetables, let the Inquisition pass on to other Living Creatures besides Man.

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 substance, the other by a Reparation or Restoration; 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 Affiliation 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 Statures, 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, as you omit for the present all Astrological Observations, and the Figures of Heaven, under which they were born; only infil upon the vulgar and manifest
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 Ear, 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-aid Article, touching the places of their Habitation.

Inquire touching the Length and Shortness of Life in Men, according to their Studies, their several Courses 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.

Hitherto 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 Arefaltion and Confufion, at least which put off and protract 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 Hous, or rather Den of Deaths, it will be convenient to make Inquisition of this thing; yet not of every kind of Death, but of those Deaths which are caused by want and indigence of Nourishment, not by violence; for they are those Deaths only which pertain to a decay of Nature, and meer old Age.

Inquire touching the Point of Death, and the Porches of Death, leading thereto from all parts, so as that Death be caused by a decay of Nature, and not by Violence.

Lastly, because it is behoveful to know the Character and Form of Old Age, which will then beft 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, by that 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 Faculties 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.

To the first Article.

1. Metals are of that long lasting, that Men cannot trace the beginnings of them; and when they do decay, they decay through Luft, not through Perpiration into Air; yet Gold decays neither way. Quick-flo\textsuperscript{r}or, 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 Lust.

Stones, especially the harder sort of them, and many other Fossiles, are of long-lasting
The History of Life and Death.

ing, 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 Nitre, which is to them instead of Rust. Precious Stones and Crystals exceed Metals in long lasting; but then they grow dimmer and less Orien, 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-bars of windows. And no marvel, seeing in all puresfaction (as Rust is) Moisture hastens Dissolutions; in all simple Aresfation, Drinels.

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 midst is soft, and the outward part harder; but in Timber-trees, as the Oak, the inner part (which they call Heart of Oak) lastseth 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 likewise will last many ages, though not so long as Parchment.

Such things as have passed the Fire last long, as Glass and tricks; likewise Flesh and Fruits that have passed the Fire last longer than Saw: and that not only because the Baking in the Fire fords puresfaction; 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 transparency, will soon alter wax white, and lose the transparency against the watry vapour exhaling; but oiled Paper will keep the transparency long, the Oil not being apt to exsude; and therefore they that counterfeit mens hands, will lay the oiled paper upon the writing, they mean to counterfeit, and then afly to draw the lines.

Gums all of them last very long; the like do wax and Honey.

But the equal or unequal use of things conduceth no less to long lasting or short lasting, than the things themselves; for Timber, and Stones, and other Bodies, standing continuall 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 coated just as they were before.

Observations.

Let this be laid for a Foundation, which is most sure, That there is in every Tangible body a Spirit, or body Pneumatical, enclosed and covered with the Tangible parts; and that from this Spirit is the beginning of all Dissolution and Consummation, so as the Exsudate against them is the detaining of this Spirit.

This Spirit is detached two ways: either by a strict Enclosure, as it were in a Prison; or by a kind of free and voluntary Detention. Again, this voluntary stay is perfusd two ways: either the Spirit is self be not too movable or eager to depart; or of 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 binds in the Spirit's close; Oily partly entwist the Spirit to stay, partly is of that nature that it is not importuned by Air; for Air is communical 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
three or four years; as the Violet, Strawberry, Burnet, Primrose, and Sorrel. But Borage and Rushes, which seem so like when they are alive, differ in their deaths; for Borage will last but one year, Rushes will last more.

But many trees bear their age and years better; Hyssop, Thyme, Savory, Pot-marjoram, Balm, Wormwood, Germander, Sage, and the like. Fenelon dies yearly in the stalk, buds again from the root: but Iris 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 Hyssop twice a year hath continued forty years.

Trees and shrubs live threescore years, and some double as much. A Vine may attain to threescore years, and continue fruitful in the old age. Rosemary well placed will come all to threescore years; but White Thorn and Ivy endure above one 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 lives are the Oak, the Holm, Wild-ash, the Elm, the Beech tree, the Chestnut, the Plane-tree, Ficus Ruminalis, the Lote tree, the Wild-olive, the Palm-tree and the Mulberry tree. Of these, some have come to the age of eight hundred years; but the least lives of them do attain to two hundred.

But trees do not, or that have sweet woods, and Trees Rosome, last longer in their Woods or Timber than those above-said, but they are not so long-lived; as the Cypresses, Maple, Plume, box, Juniper. The Cedar being born out by the rashness 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 trees sometimes do: but the Poplar, Lime-tree, Willow, and that which they call the Sycamore, and Walnut-tree, live not so long.

The Apple-tree, Pear-tree, Plum-tree, Pomegranate-tree, Citron-tree, Medl-R-Tree; Black-cherry tree, Cherry-tree, may attain to fifty or sixty years; especially if they be cleansed from the Motes wherewith 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 hardness of substance: and trees bearing Fruit or Nuts are commoner longer lives than trees bearing Fruits 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 sweet fruit.

An Observation.

Aristotle noted well the difference between Plants and living Creatures, in respect of their Nourishment and Reparation. Namely, that the bodies of living Creatures are confined within 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 Excrement; so as the juice of living creatures must of necessity grow with age: but in Trees, which put forth yearly new boughs, new roots, 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 and old, it happens withal, that the stock and body of the tree, through which the sap passeth 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 Aristotle noted it not, neither hath he expressed these things so clearly and perspicuously) in Hedges, Coppes, and Pollards, when the flourishing, shedding, or lopping comforteth the old stem or stock, and maketh it more flourishing and longer-lived.

Defection,
Fire and strong Heats dry some things, and melt others.

Titus Cicero 's difcifits, & had at Cora liquifits, tno codemque Lona ?

How this Clay is hardened, and how this wax is melted, with one and the same thing, Fire? It dryeth Earth, Stones, wood, Cloth, and Skins, and whatsoever is not liquefiable; and it melteth Metals, wax, Gums, Butter, Tallow, and the like.

Notwithstanding, even in those things which the fire melteth, if it be very vehement and continueth, it doth at last dry them. For metal in a strong fire, (Gold only excepted) the volatile part being gone forth, will become less ponderous and more brittle; and those oily and fat 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 suddenly doth the air this, if it be either enlightened with the Sun-beams, (so that they cause no purefaction) or if the air be stirrèd, as when the wind bloweth, or in rooms open on all sides.

Age most of all, but yet flow'let of all, drieth: as in all bodies which (if they be not prevented by purefaction) 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, which licketh up the moisture of the body, and then, together with it, lieth forth; and the air ambient, which multiplieth it left upon the native spirits and juices of the body, and precludeth upon them.

Cold of all things most properly drieth: for drying is not caus'd but by contrailion; now contrailion 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 Winter, or perhaps of Ice, or of snow, or of Night; therefore the drying caus'd by cold is but weak, and easily resolved. Notwithstanding we see the surface of the earth to be more dry'd by Fog, 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, as in Bacon and Neats tongues which are hang'd up in the chimney; and Perfumes of Sybaritis, or Licium Aloe, and the like, dry the Brain, and cure Catarrhs.

Salt, after some reasonable continuance, drieth, not only on the out-side, but in the inmate also; as in Fish, and Fowl salted, which if they have continued any long time have a manifast hardnes within.

Hot Gums applied to the skin dry and wrinkle it; and some astringent waters also do the same.

Spirit of strong waters imitateth the fire in drying: for it will both potch an Egg put into it, and tost Bread.

Powders dry like Spagges by drinking up the moisture, as it is in Sand thrown upon Lines new written: also smoothnest and polishes of bodies, (which suffer not the vapour of moisture go in by the pores) dry by accident, because it exposeth 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 vanishteth like a cloud. And thus much for Defecation or Drying.

They use at this day in the East parts of Germany Garners in Vats to under ground, wherein they keep Wine, and other grains, laying a good quantity of straw both under the grans and about them, to save them from the dampness of the Vats; by which device they keep their grains 20 or 30 years. And this doth not only preserve them from fustiness, but (that which pertains more to the present ingestion) prefers 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 Thrace, 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 Solars, an upper and a lower; and the upper Solar hath an hole in it, through which the grain continually descends, 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 Greadness, and slacketh the Defication of it. The Cause is that which we noted before, That the discharging of the V
dary humour, which is quickned by the Mortand and the V
dinds, prefers the Oily humour in his being, which otherwife would fly out together with the V
dary humour. Alfo in fome Mountains, where the Air is very pure, dead Carkefs may be
kept for a good while without any great decay.

Fruits, as Pomegranates, Citrons, Apples, Pears, and the like; also Flowers, as Saffee and
Lycees, may be kept a long time in Earthen Veffels clofe stopped: howsoever, they are
not free from the injuries of the outward Air, which will affect them with his unequal Tempers through the fides of the Veffel, as it is manifeft in heat and cold. Therefore it will be good to stop the mouths of the Veffels 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 V
er, fo as the place be shady, as in Wells or Ciferns placed within doors: but tho’ that be fink in \ener will do better in Glafs vefHels than in Earthen.

Generally tho’ fome things which are kept in the Earth, or in Vaults under ground, or in the bottom of a Well, will prefervre their frefhnefs longer than tho’ things that are, kept above ground.

They fay it hath been obferved, that in Confervatories of Snow (whether they were in Mountains, in natural Pits, or in Wells made by Art for that purpofe) an Apple, or
Cheru, or Nut, by chance falling in, after many months, when the Snow hath melted, hath been found in the Snow as frefh and fair as if it had been gathered the day before.

Country people keep Clusters of Grapes in Meal, which though it makes them lefs pleasant to the taste, yet it preferveth their moifture and frefhnefs. Alfo the harder fort of
Fruits may be kept long, not only in Meal, but alfo in Sawdust, and in heaps of Corn.

There is an opinion held, that boders may be preferved frefh in Liquors of their own
kind, as in their proper Menftrua; as, to steep Grapes in Wine, Olive in Oil.

Pomegranates and Quinces are kept long, being lightely dipped in Sea-water or Salt-
water, and soon after taken out again, and then dried in the open Air, to be in the Shade.

Bodies put in Wine, Oil, or the Lees of Oil, keep long; much more in Honey or Spirits of
Wine; but moft of all, as fome fay, in Quick Siver.

Fruits inclofed in Wax, Pitch, Plaifer, Paste, or any the like Cafe or Covering, keep green very long.

It is manifeft that Flies, Spiders, Ants, or the like fmall creatures, falling by chance into
Amber, or the Gums of Trees, and fo finding a burial in them, do never after corrupt or
rot, although they be foft and tender Bodies.

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 prefting
nor bruifing, which they muft needs fuffer if they were laid upon any hard fubftance;
the other, that the Air doth encompafs them on every fide alike.

It is obferved that Furefafeon, no lefs than Defecfion in Vegetables, doth not begin
in every part alike, but chiefly in that part where, being alive, it did attract nourifh-
ment. Therefore fome advise to cover the faltly of Apples or other Fruits with Wax
or Pitch.

Great Wicks of Candles or Lamps do fooner consume the Tallow or Oil than leffer
Wicks; alfo Wicks of Cotton fooner than tho’fe of Raff, or Straw, or fmall Things: and
in Staves of Torches, tho’fe of Juniper or Firre fooner than tho’fe of Asfo: likewise
Flame moved and fanne’d with the Wind fooner than that which is still: And therefore
Candles fett in a Lanthorn will laft longer than in the open Air. There is a Tradition, that
Lamps fett in Sepulchres will laft an incredible time.

The Nature alfo and Preparation of the Nourifhment conduceth no lefs to the lafting
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.

Trees, if you flir the Earth about their Root every year, will continue longer time,
for 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 D’numg them, or laying of Marl
about their Roots, or much Watering them, adds to their fertility, but cuts off from
their long lafting. And thus much touching the Prohibiting of Defecfion or Con-
sumption.

The
The History of Life and Death.

The Intemperance 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, where with they are 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 of clift with dryness, steep'd in Water, clofe again.

Bows grown hard and obfinate with age, by greasing them before the Fire with Tallow, wax soft, or being only held before the Fire get fome of them, Bladders and Parchments hardened also become tender with warm Water, mixed with Tallow or any Fat thing; but much the better, if they be a little chafed.

Trees grown very old, that have stood long without any culture, by digging and opening the Earth about the Roots of them, feem 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 Paffure, will get young and tender flesh again, in fome, that they will eat as ftreth and tender as a Steer.

A ftrict Enacrating Diet of Glucorum, Bifket, and the like, (where with they ufe to cure the French-Pox, Old catarrhs, and fome kind of Dropsies) doth ftrict bring men to great poverty and leannefs, by wafting the Juices and Humors of the Body; which after they begin to be repaired again, feem manifeltly more vigorous and young. Nay, and I am of opinion, that Enacrating Difcafes afterwards well cured, have advanced many in the way of long life.

Observations.

Men fee clearly, like Owls, in the Night of their own Notions; but in Experience, as in the Day-light they wink, and are but half-fighted. They fpeak much of the Elementary quality of Siccity or Dryness, and of things Defeating, and of the Natural Periods of Bodies, in which they are corrupted and consumed: But mean while, either in the beginnings, or middle paffages, or lafts acts of Defecation and Conflagration, they obferve nothing that is of moment.

Defecation or Conflagration in the paffages of death, is difolved by three Actions; and all thefe (as was faid before) have their original from the Native Spirit of Bodies.

The first Action, the Attenuation of the Moifure into Spirit: the fecond is, the Iffuing forth or flight of the Spirit; the third is, the Contraction of the grofer parts of the Body immediately after the Spirit isflued forth. And this lafts, that Defecation and Induration which we chiefly handle; the former two confine only.

Touching Attenuation, the matter is manifest. For the Spirit which is included in every Tangible Body forges not its nature, but whatfoever it meets within in the Body (in which it is included) that can digrate and mafter, and turn into it felf, that is plainly dafier and subjeé, and multiplifhing itself upon it, and begifts new Spirit. And this excited by one proof, instead of many; for that choife thing which are thoroughly dried are lefiened in their weight, and become bellow, porous, and fufpending from within. Now it is moft certain, that the inward Spirit of any thing, confers nothing to the weight, but rather by tens, and therefore it muft needs be, that the fame Spirit has turned into it the moifure and joyce of the Body which weighed before, by which means the weight is lefiened. And this is the first Action, the Attenuation of the Moifure, and converting it into Spirit.

The second Action, which is the iffuing forth or Flight of the Spirit, is a manifest also. For in the iffuing forth, when it is in things, it is apparent even to the fens; in vapors to the fght, in Odores to the fcenting; but in flight forth thereby, (as when a thing is decayed by age) then it is not apparent to the fens; but the matter is the fame. Again, where the compofition of the Body is either fo firelefs or fo tenacious, that the Spirit can find no porour paffage by which to depart, then, in the doeing to go out, it dures before it the grofer 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 iffuing forth or Flight of the Spirit.

The third Action is somewhat more offence, but full as certain; that is, the Contraction of the grofer parts after the Spirit isflued forth. And this appears, firft, in that Bodies after the Spirit isflued forth, do manifeftly fhrink, and fill a lefs room; as it is in the
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The Kernels of Nuts, which after they are dried, are too little for the Shells; and in Beams and Flanchers of Houses, which at first lay close together, but after they are dried, give; and likewise in Bowls, which through droughts, grow full of crannies, 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 itself is such; that by the contraction it brings the parts nearer together, and so lifts them up; for whatsoever is contracted on the sides, is lifted up in the midst: And this is to be seen in Papers and old Parchments, and in the Skins of Living Creatures, and in the Coats of soft Cheeses, all which, with age, gather wrinkles. Thirdly, This Contraction shows itself most in these things, which by heat are not only wrinkled, but ruffled, and pleased, and, as it were, runed together; as 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 plighting. Now in most things where it comes not to wrinkling or plighting, there is simple Contraction, and angulation or freighting, and induration or hardening, and defecration, as was foined in the first place. But if the issuing forth of the Spirit, and absorption or waste of the Moiture be so great, that there is not left body sufficient to unite and contrast it self, then of necessity Contraction must cease, and the body become patriad, and nothing else but a little dust cleaving together, which with a light touch is dispersed and Jallished abroad; as it is in Bodies that are rotten, and in Paper burnt, and Linnen made into Tinder, and Barkes embalmed after many ages. And this is the third Action, the Contraction of the groffer parts after the Spirit issued forth.

7. 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 Moiture; and then it follows by accident, that the other parts should contract themselves, either for the flying of Vacuum alone, or for some other motion withal, whereof we now speak not.

8. It is certain, that Putrefaction takesst its original from the Native Spirit, not from then Arcfaction; but it goeth on a far different way: For in Putrefaction, the Spirit is not simply vaporized forth, but being retained in parts, works strange garboils; and the groffer parts are not so much location contracted, as they congregate themselves to parts of the same nature.

Length and Shortness of Life in Living Creatures.

The History.

Touching the Length and Shortness of Life in Living Creatures, the Information which may be had, is but slender. Observation is neglected, and Tradition fabulous. In Tame Creatures, their degenerate life corrupteth them; in Wilde Creatures, their exposing to all weathers, oftener intercepteth them. Neither do those things which may seem concomitants, give any fartherance 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.

1. Man's 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 disposed, 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.

2. The Elephant by undoubted relation, exceeds the ordinary race of Man's 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 bulk is great, his time of growth until the thirtieth year, 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.

3. Lions are accounted long lives, because many of them have been found Toothless, a sign not to certain, for that may be caused by their strong breath.

4. The Bear is a great sleeper, a dull beast, and given to cave; and yet not noted for
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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 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 live, a lean Creature, and fine, 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 or a burthen more rarely. The Asf lives commonly to the Horse's age; but the Mule out-lives them both.

The Hart is famous amongst men for long life, yet not upon any relation that is undoubted. They tell of a certain Hart that was found with a Collar about his neck, and that Collar hidden with Fat. The long life of the Hart is the 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 live, 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 Bitch bringeth forth many at a burden, and goeth nine weeks. The Ox is like wise, for the greatness of his body and strength: but a short live, about some fifteen 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, fleshy, and soon fattened, and living only upon Herby substantias, 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 Collar, yet he hath the most curled Coats of any; other, for the Hair of no Creature is so much curled as Wool is. The Rams generate not before the third; car, and continue able for generation until the eighth. The Ewe bear young as long as they live. The Sheep is a diseased Creature, and rarely lives to his full age.

The Goat lives to the same age with the Sheep, and is not much unlike in other things; though he be a Creature more nimble, and of somewhat a finer flesh, and so should be longer-liv'd; but then he is much more lascivious, and that shortens his life.

The Sow lives to fifteen years, sometimes to twenty: and though it be a Creature of the most fleith, yet that seems to make nothing to Length of Life. Of the Wild Boar or Sow we have nothing certain.

The Cat's age is between fix and ten years: a creature nimble and full of spirit; whole feed (as Athenians report) burneth the Female; whereupon it is said, That the Cat conserve with pain, and brings forth with ease: A Creature ravenous in eating, rather swallowing down his meat whole than feeding.

Hares and Conies 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 Cony lives under ground; and the Hare above ground; and again, that the Hare is of a more dast if flesh.

Birds for the size of their bodies are much lesser than Beasts; for an Eagle or Swan is but a small thing in comparison of an Ox or Horse, and so is an Eel'ish 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 very hot and strong concoction.

The
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 life to generation than the Female, but that it rather affords Activity than matter; so that fruitful Eggs and unfruitful Eggs are hardly distinguished.

Birds (almost all of them) come to their full growth the first year, or a little after. It is true, that their Feathers in some kinds, and their Bills in others, knew their years, but for the growth of their Bodies it is not so.

The Eagle is accounted a long liver; yet his years are not set down; and it is alleged as a sign of his longevity, that he calls his Bill, whereby he grows young again: from whence comes that Old Proverb, The old age of an Eagle. Notwithstanding perchance the matter may be thus, That the renewing of the Eagle doth not cast his Bill, but the calling of his say 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, inasmuch 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 sordid 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 Raven likewise is reported to live long, sometimes to an hundred years: he feeds on Carrion, and flies not often, but rather is a meddlesome and malankolick Bird, and hath very black flesh. But the Crow, like unto him in most things, (except in greatness and voice) lives not altogether so long, and yet is reckoned amongst the long livers.

The Swan is certainly found to be a long liver, and exceeds not unfrequency an hundred years. He is a Bird excellently plumed, 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 fexen quam Asper 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 young 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 the 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 fore he was before he was brought over: a Bird eating almost all kind of meats, chewing his meat, and renewing his bill; like-wise curst and mischievous, and of a black flesh.

The Peacock lives twenty years; but he comes not forth with his Argus Eyes before he is three years old; a Bird flow of pace, having white and black bill.

The Dung-hill-Cock is warious, martial, and but of a short life; a crank Bird, being also white flesh.

The Indian-Cock, commonly called the Turkey Cock, lives not much longer than the Dung-hill-Cock: an angry Bird, and hath exceeding white flesh.

The Ring Doves are of the longest sort of living, inasmuch that they attain sometimes to fifty years of age: an merry Bird, and both builds and sits on high. But Doves and Turtes are but short-lived, not exceeding eight years.

But Thrasona and Partridges may live to fifteen years. They are great breeders, but not so white of flesh as the ordinary Pheen.
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The Black bird is reported to be, amongst the lefter birds, one of the longest lived; an unhappy bird, and a good finger.

The sparrow is noted to be of a very short life; and it is impoused in the Males to their fecundity. But the Linnet, no bigger in body than the Sparrow, hath been observed to have lived twenty years.

Of the Ejsrich we have nothing certain: those that were kept here have been found unfortunate, that no long life appeared by them. Of the bird Ibis we find only that he lived 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 breath not, by which means their vital spirit is more cloathed 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 fatter and more tender than that of terrestrial creatures: they grow exceedingly fat, or so much 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, only 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 life, that Virgilus 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, 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 Troutts: but the Perch is slow of growth, long of life.

Touching that monstrous bulk of the Whale or Ork, how long it is weeded by vital spirits, we have received nothing certain; neither yet touching the Sea-calf, and Sea-bog, and other innumerable Fishes.

Vocodiles are reported to be exceeding long-lived, 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 Cases. A few things we will set down.

There are more kinds of Birds found to be long lived 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, and others; though they come to their full growth within a year, and are least of bodies: surely their clothing is excellently good against the displacements 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-lived. Again, their Motion, which (as is else-where said) is a mix 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 belly, 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 substance of the Mother than of the Father, whereby their Spirits are not so eager and hot.
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2. 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 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: In short, I am of opinion, that even among Men, (which I have noted in some) those that resemble their Mothers most are longest-lived; and those the Children of Old men begotten of young Wives, if the Fathers be found, not defaced.

The first breeding of Creatures is ever material, either to their hurt or benefit. And therefore it stands with reason, that the latter Comprehension, 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 Birds, in Creatures bearing but one at a birth.

The long Bearing in the Womb makes for Length of Life three ways. First, for 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 preadatory force of the Air, besides, it shows that Nature intendeth to finish her periods by larger Circles. Now though Oxen and Sheep, which are born in the womb about six months, are but short-lived, that happens for other cases.

Feeder upon Grass 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 time (as men use to say) from above their heads; and the Goose, besides Grass, findeth something in the water, and stumble to feed upon.

It supposes that a good Cloathing of the Body maketh much to a long life; for it fenceth and armeth against the inclemencies of the air, which do wonderfully affect and decay the body, which benefit Birds especially have. Now that Sheep, which have so good Fleeces, should be so short-lived, is to be imputed to Diseases, whereby a Creature is full, and to the bare eating of Grass.

The seat 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 warfare 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 shortned, and 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 shorter-livers.

I am of opinion that Carriage is of all other motions the most helpful to a 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 whose lives we have no certainty.

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 puts 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.

Milder Creatures are not long-lived, as the Sheep and Dove; for Choler is as the water
3. whetstone and Spur to many Functions in the Body.

4. Creatures whose Flesh is more dusky-shew are longer-lived than those that have white Flesh; for it showeth that the juice of the body is more firm, and less apt to disintegrate.

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 is sooner evaporated, the Body of a Tree withereth not so fast as a Twig. And therefore generally (I speak it of Species, not of Individuals) Creatures that are large in body are longer-lived than those that are small, unless there be some other potent cause to hinder it.
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Alimentation, or Nourishment: and the Way of Nourishing.

Nourishment ought to be of an inferior nature, and more simple sustenance than the thing nourished. Plants are nourished with the Earth and Water, Living Creatures with Plants. Man with living Creatures. There are also certain Creatures feeding upon Flesh, and Man himself takes Plants into a part of his Nourishment, but Man and Creatures feeding upon Flesh are scarcely nourished with Plants alone: perhaps Fruit or Grains, baked or boiled, may, with long ufe, nourish them; but Leaves or Plants or Herbs will not do it, as the Order of the Plants shewed by Experience.

Over-great Affinity or Confusableness of the Nourishment to the thing nourished proveth not well: Creatures feeding upon Herbs touch no Flesh; and of Creatures feeding upon Flesh, few of them eat their own kind: As for Men, which are Carnibals, they feed not ordinarily upon Men flesh, but referre it as a Dainty, either to serve their revenge upon their enemies, or to satisfies their appetite at some times. So the Ground is best fowed with Seed growing elsewhere, and Men do not ufe to Grafs or Inoc.

By how much the more the Nourishment is better prepared, and approacheth nearer in likeness 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 it be prickd 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, grow 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 but lately, the 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: Alfo 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 hatcht.

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 paffeth rather by the Bark and Outward parts then by the Pitch and Inward parts; for if the Bark be pin'd off, though but for a small breadth, round, they live no more: and the Blood 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, Expiration and Attraction; whereof the former proceeds from the Inward Function, the latter from the Outward.

Vegetables assimilate their Nourishment simply, without Excreting: For Guns and Tears of Trees are rather Excrectes then Excrements, and Knots or knobs are nothing but Diseas. But, the substance of living Creatures is more perceivable of the like; and therefore it is conjourned with a kind of dillenbey, whereby it rejecteth the bad, and assimilateth the good.

It is a strange thing of the slaty 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 join'd to the Stock without some slat.

It is to be noted, that the Seeds of living Creatures will not be fruitful but when they are new laid, 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 frefh 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 savoury Meats please best.
Above all it maketh to the present Inquisition, to inquire diligently and attentively whether a man may not receive Nourishment from without, at least some other way beside the Mouth. We know that Baths of Milk are used in some Helteek Fevers, and when the body is brought extrem low, and Physicians do provide Nourishing Cysters. 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 weaknes of Concoction, which is incident to old men, might be recompensed by these helps, and Concoction restored to them intire.

Length and Shortness of Life in Man.

The History.

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 posterity 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 Poff-nati; 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 a high courage, and prosperous in all things. Isaac came to an hundred and eighty years of age: a child 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. Ishmael, 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 beautifull and magnanimous woman: a singular good Mother and Wife; and yet no less famous for her Liberty, than Obsequioufness towards her husband. Joseph also, a prudent and politick man, pasling 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 grand child, 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 low tongue. Howsoever Moses in his Psalm 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 reader speech, of a more facile disposition, and less constant. But Phineas, grandson 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 consultted 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. Josua, a martial man, and an excellent Leader, and evermore victorious, lived to the hundred and tenth year of his life. Caleb was his Contemporary, and saweth to have been of as great years. Ebed the Judge seems to have been no les than an hundred years old, in regard that after the Victory over the Amorites 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 restraution of his happiness, an hundred and forty years, being before his afflictions of that age that he had sons at man's estate: a man po-
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Eli the Priest lived ninety eight years; a copulent man, calm of disposition, and indulgent to his children. But Elijah 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 three years, that the boys mocked him by the name of Bald-head: a man vehement and severe, and of an austere life, and a conserver of riches. Also Isaiah the Prophet seems 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 wept for the unlikeness 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 expectation. Into the same time also fell Anna the Prophetess, who could not possibly be less than an hundred years old; for she had been seven years a wife, about forty 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 fastings and prayers.

The long Lives of Men mentioned in Heathen Authors have no great certainty in them; both for the intermixtude of Fables, whereunto those kind of relations were very prone, and for their false calculation of years. Certainly of 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 Farm 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 sixt Conscript fifty six years: a man valorous, affable, popular, and always fortunate.

Selon 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 affectionate 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 madness of his opinions from Xenophon to Xenonanes: a man no doubt of a great conceit, and that minded nothing but intuition.

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,ingular in his conceits, and a great adorer of the gods. Sophocles the Athenian attained to the like age: alofty Tragick Poet, given over wholly to Writing, and neglectful of his Family.

Artaxerxes King of Persia lived ninety four years: a man of a dull wit, averse to the dispatch of business, defirous 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 notwithstanding ambitious, and a Warrior, and no less stout 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. Protagoras of Abdera 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. Iocrates 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. Democritus of Abdera reached to an hundred and nine years: he was a great Philosopher, and, if ever any man amongst the Grecians, a true Naturalist; a Surveyor of many Countries, but much more of Nature; also a diligent searcher into Experiments, and (as Aristote objected against him) one that followed Similitudes more than the Laws of Arguments. Diogenes the Siuopen lived ninety years: a man that used liberty towards others, but tyranny over himself: a course dict, 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 mens opinions; also of a great acuteness, but yet not troublesome, choosing rather to take mens 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 Gessian arrived at eighty five years of age; a man sweet for his eloquence, sweet for the variety of his matters, and who selected the pleasant things of Philosophy, and let the bitter and harsh go. Cato the Wiseman of Rome many years after came to the like age of eighty five years: a man of a fluent eloquence, and one who 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 Souldier, then a Schoolmaster; a man by nature tart both in his Tongue and Pen, and severe towards his Scholars.

12. Quintus Fabius Maximus was Augur sixty three years, which shewed him to be above eighty years of age at his death; though it be true, that in the Augureship Nobility was more respected then age: a wise man, and a great Deliberator, and in all his proceedings moderate, and not without affability severe. Mucina the 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 tasted 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 bitter tongue, 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 croffes; first, with the banishment of her Husband; then with the difference betwixt them; lastly, with his last fatal misfortune: She was also oftentimes vexed with the Gout. Lucina must needs exceed an hundred by many years; for it is said that she entered 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 Cepiola, 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 Senators 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 superiour in dignity, which lived well near ninety years, I mean Livia Julia Augusti, wife to Augustus Cesar, 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 Play 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 Maternal carriage, pragmatical, and upholding her power. But Junia, the wife of Caius Caesar, and foster to Marcus Brutus, was also ninety nine years old; for she survived the Philippic Battle sixty four years: a magnanimous woman, in her great wealth.
happy in the calamity of her husband and near kinsfolks, and in a long widowhood unhappy; not withstanding much honoured of all.

The year of our Lord seventy fix, falling into the time of Vetulanius, is memorable; in which we shall find, as it were, a calendar of long-lived men: For that year there was a Taxing, (now a Taxing is the most Authentical and truth Informer touching the ages of men;) and in that part of Italy which lieth between 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 these, farms in particular afforded five; whereof three fulfilled an hundred and twenty years, and two an hundred and thirty: bruxellenses afforded one of an hundred and twenty five years old; Placentia one, aged an hundred thirty and one: Ercovia one woman, aged one hundred thirty and two: a certain Town, then called Velleiatium, 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 Aperius.

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 Elogy; but of that for brevity's sake, in our judgment, Length of Life (which is not a little subject to the Manners and Fortunes of men) hath some relation, and that in a two-fold respect: either that such kind of men are for the most part long-lived; 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 Almain, to these our days, which make up the number of well-near two hundred Priyces, there are only four found that lived to eighty years of age: unto whom we may add the two first Emperors, Augustus and Tiberius; whereas of 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 Livius and Cæsæ had been pleased. Augustus (as was said) lived seventy and six years: a man of moderate disposition; in accomplishing his designs vehement, but otherwise 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, insomuch as they despaired of life in him; whom Antonius Musa the Physician, when other Physicians had applied hot Medicines, as most agreeable to his disease, on the contrary cured with cold Medicines, which perchance might be some help to the prolonging of his life. Tiberius lived to be two years older: A man with lean cheaps, 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 Lutet into a part of his diet: notwithstanding a great observer of his health, insomuch that he used to say, That he was a fool that after thirty years off age took advice of a Physicus. Germain the elder lived eighty years, and yet died a violent death when he was scarce warne 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 onely that he ended his days by a violent death. Valerian the Emperor was seventy six years of age before he was taken prisoner by Suplic 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 listed up in his own and the opinion of men, but falling short in the performance. Augustus, surnamed Dicurus, lived eighty eight years: he was of a sated mind, but too obiect, and superstitious, and fearful. Antonius Justinianus lived to eighty three years: a man greedy of glory, performing nothing in his own person, but in the valour of his Captains happy and renowned; usurious, and not his own man, but suffering others to lead him. Helena of Britann, mother of Constantine the Great, was fourscore years old: a woman that intermedled not in matters of State neither in her Husband's nor sons Reign, but devoted her self wholly to Religion; magnanimous, and perpetually flourishing. Theodora the Empresse (who was sister to Leo, 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 Sardis 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 inefcapeable Companion, and a Physician. Simon the Son of Cleopas, 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, Displeased unto the Apostles, and Bishop of Smyrna, feemeth 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. Dionysius Areopagita, Contemporary 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 Hosts. 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 Hermit lived an hundred and thirteen years: now he lived in a Cave; his diet was so slender and strict, that it was thought almost impossible to support human nature therewith: he passed his years only in Meditations and Soliloquies; yet he was not illiterate or an Idiot, but learned. St. Anthony, the first Founder of Monks, or (as some will have it) the Reformer 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. Hieronymus, 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 entire 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 forty 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 alters many things, some to the better, others only to the new, a great accumulator of Riches and Treasures. Gregory, called the twelfth, created in Sichem, and not fully acknowledged Pope, died at ninety years: of him, in respect of his short Popacy, we find nothing to make a judgment upon. Paul the third lived eighty and nine years: 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 Ely the Priest, over-indulgent to his Family. Paul the fourth attained to the age of eighty three years: a man of an earnest 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 Arganthenius, 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. Court 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: but this is delivered unto us by certain Historians, 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 Danae in Illyria, that lived without the inconveniences of old age to five hundred years. They tell also of the Eprians, a part of Etolia, that the whole Nation of them were exceeding long liv’d, insomuch that many of them were two hundred years old: and that one principal man among them, named Litorium, 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 Tempis, many of the Inhabitants lived to an hundred and fifty years. We read that the Sei of the Eprians amongst the few did usually extend their life to an hundred years: Now that Sei used a single or abstemious diet, after the rule of Pythagoras. Apollosius Tyaneus exceed’d an hundred years, his face bewraying no fuch age: he was an admirable man, of the Academis 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 Consulships happily administered, in his old age he was made Pontifex Maximus, and exercised the holy duties full two and twenty years: in the performance of which Rites his voice never failed, nor his hand trembling. It is most certain that Appius Casar was very old, but his years are not extant, the most part whereof he pass’d after he was blind; yet this misfortune no whit sootn’d him, but that he was able to govern a numerous Family, a great Retinue and Dependance, yea, even the Commonwealth itself, with great Councils. In his extreme old age he was brought in a Litter into the Senate-house, and vehemently dissuaded the Peace with Pyrrhus: the beginning of his Oration was very memorable, throwing an invincible spirit and strength of mind; I have with great grief of mind (Fathers conscript) these many years born my blindness, but now I could wish that I were myself also, when I hear you speak to such disadvantageous Treaties. Marcus Perenna lived ninety eight years, surviving all the whole Suffragers he had gathered in the Senate-house, being i. conful, I mean, all the Senators at that time; as also all those whom a little after, being Conful, 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 worshiper of the gods, and a religious confederer of Friendship: liberal, and constantly fortunate. Statilia, defended of a noble Family in the days of Claudius, lived ninety nine years. Ioda, the daughter of Otium, an hundred and fifteen. Xenophilus, 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 Islands of Corea were anciently accounted long liv’d, but now they live after the rate of other men, Hypocrates Con, the famous Physician, lived an hundred and four years, and approved and credited his own Art by so long a life: a man that coupled Learning and Wisdom together, very conversant in Experience and Observation; one that haunt’d not after Words or Methods, but feuered 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, Is it your mind?
The History of Life and Death.

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 Pandore 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 whittish, in their old age, before their gray hairs, they grow coal black, though indeed this be everywhere to be seen, that they which have white hair whilst they are boys, in their man's estate change their hairs into a darker colour. The Sires, another people of India, with their Wine of Palms are accounted long livers, even to an hundred and thirty years. Ephraenor 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 disdained his son from Poetry. Aquinas Pollio, intimate with Augustus, exceeded the age of an hundred years: a man of an uneaseliable Profuence, Eloquent, and a lover of Learning; but vehement, proud, cruel, and one that made his private ends stand on the centre of his thoughts. There was an opinion, that Seneca was an extream 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 fet 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 Claudius 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 Temporibus, among all the men of our later 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 Charles the Great. Gaius Aurelius, Great Grand-father to Petarch, arrived at the age of an hundred and four years: he had ever enjoyed the benefit of good health; besides, at the left, he felt rather a decay of his strength, than any sickness or malady, which is the true resolution by old age. Amongst the Venetians there have been found not a few long livers, and those of the more eminent sort: Francisca Donatus, Duke; Thomas Contarvenus, Procurator of St. Mark; Francisca Melinus, Procurator also of St. Mark, and others. But most memorable is that of Cornero 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 ufe 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 Pufet, a French-man, lived to an hundred and well-nigh twenty years, the top of his beard 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.

Suppose 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 Morris dance, consisting of eight men, whose age computed together made up eight hundred years, infomuch that what none 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 perffons 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 Superstition and the late Credulity of some have admitted) we account but for Fables and Dreams; especially being that which hath neither content with Philofophy nor with Divi
ty. 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 whit abated from the length of Life; for we fee that from the time of Mefi unto these our dayes, the term of man's life hath stood 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 alters not. The same, no doubt, is in other living Creatures; for neither Oxen, nor Horses, nor Sheep, nor any like, are abridged of their wonted ages at this day. And therefore the Great Abridger of Age was the Flood; and perhaps some such notable accidents (as particular 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 less affected by succession of Generations, howsoever Virgil (following the vulgar opinion) divined, that after Ages would bring forth larger Bodies than the present: whereupon speaking of ploughing up the Emanation and Amenities Fields, he faith, Grandiose, effoffis mirabilis ossa sepulchris. That after ages shall admire the great bones digged up in ancient sepulchres. For whereas it is manifested that there were hercetotem men of Gigantes Statures, (such as for certain have been found in Sicily, and else-where, in ancient Sepulchres and Caves) yet within these 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 diffusible, 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 prejudicial: 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.

Ilanders 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 Orcaes; nor so long in Africa, though under the same Parallel, as in the Canaries and Tercera's; and the Japonians are longer-liv'd than the Chinese, though the Chinese are made upon 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 Asia 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 reflecting there: and therefore in Snowy Mountains there is not found any notable long life, not in the Alps, nor in the Pyrenean Mountains, not 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 riseth to the Mountains, they live long, even at this very day, attaining many times to an hundred and fifty years.

Marines and Fens are propitious to the Natives, and malignant to Strangers, as touching the lengthening and shortening of their lives: and which may seem more marvellous, Salt-marines, where the Sea Ebbs and Flows, are less wholesome than those of Freshwater.

The Countries which have been observed to produce long-livers are these; Arcasia, Aethiops, India, on this side Ganges, Krafti, Taprobane, Britania, Ireland, with the Islands of the Orcaes and Hebrides: for as for Ethiopia, which by one of the Ancients is reported to bring forth long Livers, this is but tory.

It is a Secret; The healthfulness of Air, especially in any perfection, is better found by Experiment than by Diffusors or Conjectures. 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-speed; 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 consumes less; but air changed nouriseth and repairs 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 begotten 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 repletion, 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 Bастards) 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 begots 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 conduceth 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 between 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 Nutrit. 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 the Hebrew women did, which were ripe for Marriage at twelve or fourteen years; and if there were any thing eminent in the spartan, that was rather to be imputed to the Parimony 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 Difcases, a thing hereditary within certain bounds.

Fair in Face, or Skin, or Hairs, 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 rugged skin, such as they call the Goose skin, which is as it were spongy, but of that which is hard and cloe. A Fore-head with deep furrows and wrinkles is a better sign than a smooth and plain Forehead.

The Hairs of the Head hard and like bristles do betoken longer life than those that are soft and delicate. Curled Hairs 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 sure 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: contrariwise, 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 flender, 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 flirring.

In the proportion of the body, they which are short to the wist/s, with long Leggs, are longer liv’d than they which are long to the wist/s, and have short Leggs: also they which are large in the neither parts, and slight in the upper, (the making of their body rising, as it were, into a sharp figure) are longer liv’d than they that have broad shoulders, and are slender downwards.

Leanness, where the affections are settled, calm, and peaceable; also a more fat habit of body, joined with Choler, and a disposition flirring and peremptory, signifies long life: but Corpulency 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: contrariwise, to grow quickly to a great stature is an evil sign; if to a small stature, the less evil.

Eyes Flitty, a raw-bone body, and veins lying higher than the flesh, betoken long life; the contrary to these, short life.

A Head somewhat flitter than to the proportion of the body; a moderate Neck, not long, nor flender, nor flat, nor too short; wide Nostrils, whatever the form of the Nose be; a large Mouth; and Ear grilly, not flibey; Teeth strong and contiguous, small, or thin-let, fore-token long life; and much more if some new Teeth put forth in our elder years.

A broad Breast, yet not bearing out, but rather bending inwards; Shoulders somewhat crooked, and (as they call such persons) round-back’d: a flat Belly; a broad large, and with few lines in the Palm; a short round round Foot, Thighs not flethy; and at least the Leggs not hanging over, but neat, are signs of long life.

Eyes somewhat large, and the Circles of them inclined to greenness; Sense not too quick; the Puffe in youth flower, towards old age quicker; Facility of holding the breath, and longer than usual; the body in youth inclined to be bound, in the decline of years more laxative, are also signs of long life.

Concerning the Times of Nativity, as they refer to long life, nothing hath been observed worthy the setting down. Have only Astrological Observations, which we rejected in our opus. A Birth at the eighth month is not only long liv’d, but not likely to live. Also in later births we accounted the longer liv’d.

A Pythagorical or Monastical Diet, according to strict rules, and always equally, (as that of Ornithia was,) freeth 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 stomachs, 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 begetts few Spirits, and dull, and so wasteth the body least; and the liberal diet yieldeth more ample nourishment, and so repaireth 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 Watching. Left the Spirits being few should be oppressed with much sleep; little Exercise, left they should exhale; abstinence from Venery, 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 Venery, Eats and Amusements (such as were ancienly in use) did rather tend to deliciousness than to prolonging of life. But of all these things we shall speak more exactly when we come to the Instructions according to Intentions. Mean while that of ceteras, who was not only a learned Physician, but a wise man, is not to be omitted, who adviseth 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.
watching, sometimes to sleep; but to sleep oftentimes: again, that he should sometimes give himself to fasting, sometimes to feasting; but to fasting oftentimes: that he should sometimes inure himself to great labours of the mind, sometimes to relaxations of the same; but to relaxations oftentimes. Certainly this is without all question, that Diocletian well ordered the greatest part in the prolongation of life: neither did I ever meet an extreme long-liv'd man, but being asked of his course, he observed something peculiar; some one thing, some another. I remember an old man, above an hundred years of age, who was produced as witnesses touching an ancient Prescription. When he had finished his testimony the Judge familiarly asked him how he came to live so long. He answered, beside expectation, and not without the laughter of the hearers, by eating before I was hungry, and drinking before I was dry. But of these things we shall speak hereafter.

A life led in Religion and in Holy Exercise seemeth to conduct to long life. There are in this kind of life these things, Leisure, Admiration and Contemplation of heavenly things. Joys not fentimental, noble hopes, wholesome Fear, sweet Sorrows; lastly, continual Renovations by Observances, Penances, Expiations: all which are very powerful to the prolongation of life. Unto which if you add that voluntary diet which hardeneth the mails of the Body, and humbleth the Spirits, no marvel if an extraordinary length of life do follow; such was that of Paul the Hermit, Simeon Stilites the Columbian Anchorite, and of many other Hermits and Anchorites.

Next unto this is the life led in good Letters, such as was that of Philosophers, Rhetoricians, Grammarians. This life is also led in leisure, and in those thoughts, which, seeing they are severed from the affaiirs of the world, bite not, but rather delight through their Variety and Impertinency: They live also at their pleasures, spending their time in such things as like them best, and for the most part in the company of young men, which is ever the most cheerful. But in Philosophies there is great difference betwixt the Sects as touching long life: For those Philosophies which have in them a touch of Superstition, and are conversant in high Contemplations, are the best: as the Pythagorical and Platonick: also those which did institute a perambulation of the world, and considered the variety of natural things, and had reachlefs, and high, and magnificent thoughts, (as of Infiniwm, of the Stars, of the Heroicall Vertues, and suchlike) were good for lengthning of life: such were those of Democritus Philoains, Xenophanes, the Athlogians and Stoicks: also those which had no profound Speculation in them, but discoursed calmly on both sides, out of common Sense, and the received Opinions, without any harp Inquisitions, were like wise good: such were those of Carneades and the Academick, also of the Rhetoricians and Grammarians. But contrary, Philosophies conversant in perplexing Subtleties, and which pronounced peremptorily, and which examined and wrested all things to the Scale of Principles, lastly, which were thorny and narrow, were evil: such were those commonly of the eirippateick, and of the school-men.

The Country life also is well fitted for long life: it is much abroad, and in the open air, it is not slothful, but ever in employment; it feedeth upon fresh Cates, and unbothe: it is without Cares and Envy.

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 furthereth long life to have all things from our youth to our elder age mend, and grow to the better, that a Youth full of croffes may minister sweetness to our Old age. We conceive also that Military affections, inflamed with a desire of Fighting, and hope of Victory, do influee 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 Conserivation of Health and Cure of Diseasif. As far as things which tend properly to Long Life, there is but slight mention, and by the way only. Notwithstanding we will propose 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 Cure do defend and fortifie 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 Auran 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 Auran potabile, it is used to be given in desperate 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 minister 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 unprofitable Medicine.

Pearls are taken either in a fine Powder, or in a certain Mass, or Dissolution by the juice of four and New Limons: and they are given sometimes in Aromatical Confections, sometimes in Liquor. The Pearl, no doubt, hath some affinity with the Shell in which it grows, and may be of the same quality with the Shells of Crayfishes.

Amongst the transparent precious Stones, two only are accounted Cordials, the Emerald and the Jaselin, which are given under the same forms that the Pearls are; save only that the disolutions of them, as far as we know, are not in use. But we suspect the Gold Jewels, left they should be cutting.

Of these which we have mentioned, how far and in what manner they are helpful, shall be spoken hereafter.

Beezoar Stone is of approved verue for refreshing the Spirits, and procuring a gentle Sweat. As for the Unicorn's Horn, it hath lost the credit with us; yet lo, as it may keep rank with Hart's Horn, and the Bone in the heart of a Hart, and Ivory, and such like.

Amber, I believe, is one of the best to appease and comfort the Spirits.

Hereafter follow the names only of the simple Cordials, seeing their Vertues are sufficiently known.

<table>
<thead>
<tr>
<th>Hot</th>
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<th>Cold</th>
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<tbody>
<tr>
<td>Saffron</td>
<td>Clove-Gilly-flowers</td>
<td>Nitre</td>
<td>Juice of sweet</td>
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<tr>
<td>Pulum Indum</td>
<td>Orange-flowers</td>
<td>Roses, Violets</td>
<td>Oranges</td>
</tr>
<tr>
<td>Lignum Alcis</td>
<td>Rosmary</td>
<td>Strawberry, Lees</td>
<td>Juice of Pearmainrs, Borage</td>
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<tr>
<td>Balm</td>
<td>Cardus Benedictus</td>
<td>Juice of sweet, Burnet, Sanders.</td>
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<tr>
<td>Basil</td>
<td></td>
<td>Limons, Campbrie.</td>
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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 Triller saith, are under the Planet Mars, and have a furious and destructive force) as also all hot and buring 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 benign 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 sick's estate is to renew youth: Therefore it were good to make some Artificial Diseases, which is done by strict and Emaciating Diets, of which I shall speak hereafter.

The Intentions.

Having finished the Inquisition according to the Subjects, as namely, of Inanimate Bodies, Vegetables, Living Creatures, Man; I will now come nearer to the matter, and order mine 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 is of worth hath hitherto been required, but the contemplations of men have been but simple, and non-proficient. For when I hear men on the one side speak of comforting Natural heat, and the Radical moisture, and of Meats which breed good Blood, such as may neither be burnt nor phlegmatic; and of the clearing and recreating the Spirits: I suppose them to be no bad men which speak these things: but none of these operate effectually towards the end. But when on the other side I hear several discourses touching medicines made of Gold, because Gold is not subject to corruption; and touching Precious Stones to refresh the spirits by their hidden properties and virtue, and that if they could be taken and retained in Veils, the Balms, and Quintessences of living Creatures, would make men conceive a proud hope of Immortality: And that the Feasts of Serpents and Harts, by a certain custom, are powerful to the Renovation of Life, because the one casteth his Skin, the other his Horns: (they should also have added the Feast 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 Artificer, who when he found his Spirit ready to depart, drew into his body the spirit of a certain young man, and thereby made him breathe, but himself lived many years by another man's Spirit: And of Fortunate Hours according to the Figures of Heaven, in which Medicines are to be gathered and compounded for the prolongation of Life: And of the Scales of Planets, by which Vertues may be drawn and fetched down from Heaven to prolong Life: and subtle fabulists and superstitions vanities: I wonder exceedingly that men should so much desire, 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 beguiled with such frivolous and jingleless apprehensions.

But more Intentions do both come home to the Matter, and are far from vain and credulous Imaginations; being also such, as I conceive, poverty may add much to the masters which falsifies these Intentions; but to the Intentions themselves, but a little. Notwithstanding there are a few, and those of very great moment, of which I would have men to be warned.

First, we are of that opinion, that we esteem the Offices of Life to be more worthy than Life it self. Therefore if there be any thing of that kind that may indeed exactly answer our Intentions, yet so, that the Offices and Duties of Life be thereby hindered: whatsoever it be of this kind, we reject it. Perhaps we may make some high mention of some things, but we infallibly upon them. For we make no serious nor diligent discourse, either of leading the life in Cover, 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 Sweat-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 is more than this, and mindest nothing else but that a man live, (as was that of Heroicus amongst the Ancients, and of Cornarius the Venetian in our days, but with greater moderation;) or of any such Prodigy, Reveries, or Inconvenience: but we propose such remedies and Precepts, by which the Offices of Life may neither be defeated, nor receive any great interruptions or molestations.

Secondly,
The History of Life and Death.

Secondly, on the other side we pronounce unto men that they shall give over trifling, and not imagine that to great a work as the flaping and turning back the powerful course of nature, can be brought to pass by any Morning-draught, or the taking of some precious Drug, but that they would be assured that it must needs be, that this is a work of labour, and consists of many Remedies, and a strict connection 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.

Thirdly, 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 doth not permit that) but are derived (as we suppose) upon good reason, out of our Principles and Grounds, (of which some we set down, others we reserve in our mind) and are, as it were, cut and digged out of the Rock and Mine of Nature herself. 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 Function, which notwithstanding do cut off from the sum of Life; and there are other things which are profitable to prolongation of Life, which are not without some peril of health, unless this matter be salved by some Remedies; of which, notwithstanding, as occasion shall be offered, we will not omit to give some Cautions and Monitions.

Lastly we have thought good to propound sundry Remedies, according to these 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 agreeeth best, with which Constitution of body, which with the several courses of Life, which with each Mans particular Age, and how they are to be taken one after another, and how the whole Practique of these things is to be administered and governed, would be too long, neither is it fit to be published.

In the Topicks we propound three Intentions: The Prohibiting of Consumption, The Perfecting of Reparation, and the Renewing of Oldness. But seeing those things which shall be said are nothing 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 Insinuation thereof.

The eighth Operation is upon the last Act of Affimation.

The ninth Operation is upon the Intercration of the Parts, after they began to be dried.

The tenth Operation is upon the Purging 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 Causes, Assumptions, and whatsoever hath reference hereunto.
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 manifest by Confence, 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, preyeth 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 incertate and melt them.

7. Also in Diffusing Medicines, some vapour forth the thin part of the tumors or swellings, and thence harden the tumour; others potently discours, 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 chufc 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 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 Irgid: in Motion Appeased, not Dancing or Unequal.

11. That Vapours work powerful upon the Spirits, it is manifest by Slaep, by Drunkenness, by Melancholy Passions, by letificant Medicines, by Odours, calling the Spirits back again in Swounings and Faintings.

12. The Spirits are condenfed four ways; either by putting them to flight, or by refrigerating and cooling them, or by straeking them, or by quieting them. And first of their Condenfation by putting them to flight.

13. Whatsoever putthc to flight on all parts, driveth the body into his Centre, and so Condenfeth.

14. To the Condenfation 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 condenfation of the spirits is exceeding strong, wheras perhaps three grains thereof will in a short time fo coagulate the Spirits, that they return 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 mortified, 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 obtia a good effect from a bad cause; for the Flight of the Spirits is evil, but the Condenfation of them through their flight is good.
The History of Life and Death.

The Grecians attributed much, both for health and for prolongation of life, as Opiates: but the Arabian much more, insomuch that their grand Medicines (which they called the gods Hands) had Opium for their Basis and principal ingredient, other things being mixed to abate and correct the noxious qualities thereof: such were Trecule, Methridate, and the rest.

Whatsoever is given with good success in the curing of Pestilential and Malignant Diseases, to stop and bridle the Spirits, Left they grow turbulent and tumultuary, may very happily be transferred to the prolongation of life; for one thing is effectual unto both, namely, the condensation of the Spirits: now there is nothing better for that than Opiates.

The Turks find Opium, even in a reasonable good quantity, harmless and comfortable, insomuch 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 most.

Opium and Opiates are manifestly found to excite Venus; which shews them to have force to corroborate the Spirits.

Distilled Water of wild Popy is given with good success in Surfeits, Agues, and divers diseaes; 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 condenfed, will rise up against any diseaee.

The Turks use a kind of Herb which they call Carpe, 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 Opium.

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 champying 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 stupefaustes, because it exceedingly blacked the Teeth.

Tobacco in our age is immoderately grown into use, and it affects men with a secret kind of delight, insomuch 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 thake off wearines. 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 condensation 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 Melancholyes, with which if a man be affected, it is a sign of very long life.

The simple Opiates (which are also called stupefaustes) are these: Opium it self, which is the juice of Popy; both the Poppies, as well in the Herb as in the Seed; Henbane, Mandrake, Hemlock, Tobacco, Night-shade.

The compound Opiates are, Trecule, Methridate, Trifer, Laudanum, Paracels, Discolor, Disforium, Phallomun, all of hound-tongue.

From this which hath beene said, certain Designations or Counsels may be deduced for the prolongation of life, according to the present intension; namely, of condensing the Spirits by Opiates.

Let there be therefore every year, from Adult years of Youth, an Opiate diet; let it be taken about the end of May, because the Spirits in the Summer are more loose and attenuated, and there are less dangers from cold humors; let it be some Magistral 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 before the sleep. The face for that time would be more simple and sparing than ordinary, without Wine, or Spices, or Vaporous things. This Medicine to be taken only each other day, and to be continued for a fortnight. This Designation in our judgment comes home to the intension.

Opiates also may be taken, not onely by the mouth, but also by Fumes; but the Fumes must be such as may not move the expulsive Faculty too strongly, nor force down humors, but onely taken in a West, may work upon the Spirits within the brain. And therefore a Saffumutation of Tobacco, Ligurn-Aloe, Rosemary-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 amiss (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 fetheth. 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 send 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 Cardamoms, Amber-grases, Coriander-seed prepared, Amonium, Psuedo-mamon, Lignum-Rosinum, Orange-flower water, and much more the Infusion of the fame 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 Venice, by the use of Amber, is said to have lived an hundred and fifty years; and the Noble-men of Barbary, through the use thereof, are certified to be very long lived, whereas the mean people are but of short life. And our Ancestors, who were longer lived than we, did use Saffron much in their Cakes, Broths, and the like. And touching the first way of condensing the Spirits of Opiates and the Subordinates thereto, thus much.

Now we will enquire of the second way of condensing the Spirits by Cold. For the proper work of Cold is Condensation, and it is done without any malignity, or adverse quality; and therefore it is a safer operation than by Opiates, though 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 Refrigeration, 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 fogginess in it, before it be received into the Lungs, and which is least exposed to the Sun-beams, condenseth the Spirits best. Such is found either on the tops of dry Mountains, or in Champanes open to the wind, and yet not without some shade.

As for the Refrigeration and Condensation of the Spirits by Vapours, the Root of this operation we place in Nitre, as a Creature purposely made and chosen for this end, being thereunto led, and perswaded by these Arguments.

Nitre is a kind of cool Spice: this is apparent to the sense it self, for it bites the Tongue and Palate with cold, as Spices do with heat, and it is the onely thing, as far as we know, that hath this property.

Almost all cold things (which are cold properly, and not by accident, as Opium is) are poor and jejune of Spirit; contrarily, things full of spirit are almost all hot, only Nitre is found amongst Vegetables, which aboundeth with Spirit, and yet is cold. As for Camphire, which is full of Spirit, and yet performeth the actions of cold, it cooleth by accident only; as namely, for that by the thinnest thereof, without Actimony, it helpeth perspiration in inflammations.

In congealing and freezing of Liquors (which is lately grown into use) by laying Snow and Ice on the out-side of the Vessel, Nitre is also added, and no doubt it exciteth and fortifieth the Congelation. It is true, that they use alfo for this work ordinary Bay-Salt, which doth rather give activity to the coldness of the Snow, than cool by it self; But, as I have heard, in the hotter Regions, where Snow falls not, the congealing is wrought by Nitre alone; but this I cannot certainly affirm.

It is affirmed that Gun powder, which conffith principally of Nitre, being taken in drink, doth conduce to valour, and that it is used occasionly by Marineres and Soundiers before they begin their Battels, as the Turks do Opium.

Nitre
The History of Life and Death.

Nitre is given with good success in burning Agues, and Pleadential Fevers, to mitigate and bridle their pernicious heats.

It is manifest, that Nitre in Gunpowder doth mightily abhor the flame, from whence it is caus'd 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 Nitrour matter, if it be fed up and covered, that it be free from the Sun-beams, and puted forth no Vegetable, will gather Nitre, even in good abundance. By which it is clear, that the Spirit of Nitre is not merely inferior to the Spirit of living Creatures, but also to the Spirit of Vegetables.

Castile which drink of Nitrour water do manifestly grow fat, which is a sign of the cold in Nitre.

The manuring of the Soil is chiefly by Nitrour Substances; for all Dung is Nitrour, 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, Nitre doth compose and repel 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 howsoever it be 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 Subordinates, less poten't, but more safe, which may be both taken 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 day's 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 digged or turned up; of this sort the chief are, Endive, Succory, Liverwort, Purslane, and the like, do also by conseqent cool the Spirits; but this is about, whereas vapours cool immediately.

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-sorrel, or Hoot-huckle, taken as they grow, in passing 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 sleepe, a Cold of freth Earth laid in a fair Napkin under his Nose, that he might take the like thereof.

There is no doubt, but the cooling and tempering of the blood by cool things, such as are Endive, Succory, Liverwort, 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 condensing the Spirits, we said to be by that which we call breaking the Spirits: The fourth, by quieting the dexterity and warmth of them.

Such things broke the Spirits as are pleasing and friendly to them, yet they allure them not to go abroad; but rather prevail, that the Spirits contented, as it were, in
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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 quelling 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 master 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, Hild marrabum, 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 Elecampane, Garlic, Cardius Benedictus, Water-cresses while they are young, Germander, Angelica, Tedary, Vervain, Valerian, Myrrhe, Pepper-wort, Elder flowers, Garden-Chervil: 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 an heat by composition, which is wished, but not to be found, in Simples. For the mixing of those excessive hot things (such as are Euphorbium, Pelitory of Spain, stews-ace, Dragon-wort, Anacardi, Callemum, Azropholium, Opponans, Amnionium, Galbanum, and the like, which of themselves cannot be taken inwardly) to qualifie and abate the stupendious 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 Flomach, and in their subsequent operations.

There conduceth also to the robust heat of the Spirits Venus often excited, rarely performed; and no lesse some of the affections, of which shall be spoken hereafter. So touching the heat of the Spirits, Analogical 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 share Diet, and almost a Pythagorical, such as is either prescribed by the strict Rules of a monastical life, or practiced by Hermits, which have Necessity and Poverty for their Rule, rendeth a man long-lived.

Hitherto appertain drinking of water, a hard Bed, abstinence from Fire, a tender Diet, (as namely, of Herbs, Fruits, Flebs, 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 quantum as may be sufficient onely for the Functions of Life, whereby the deprivation is the les.

But if the Diet shall not be altogether so rigorous and mortifying, yet notwithstanding shall be always equal and contain 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) consumes less of the fuel than a letter Flame blown with Bellows, and by Gutch 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 just 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, omitteth not a feasible use of Venus, lest the Spirits increase too fast, and soften and destroy the body. So then, touching a moderate quantity of Spirits, and (as we may say;) Frugal, thus much.

The Inquisition touching bridling the motions of the Spirits followeth next.
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Motion doth manifestly attenuate and inflame them. This bridling is done by three means: by Sleep; by avoiding of vehement Labour, immoderate Exercise, and in a word, all Latiudine; and by refraining fromsome Affections. And first, touching Sleep.

The Fable tells us, that Epimenides slept many years together in a Cave, and all that time needed no meat, because the Spirit was 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 refrain all vital Consumption. That which Bees and Drones are also thought to do, though sometimes destinuate of Honey; and likewise Butter-flies, and other Flies.

Sleep after Dinner (the stomack hasting 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 best, 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 Pill, or a small Draught of these things, and to use it familiarly. Also those things which flut the mouth of the stomack close, as Coriander-seed prepared, Quinces and Wardens roasted, do induce found sleep; but above all things in youth, and for those that have sufficient strong stomacks, it will be best to take a good draught of clear cold Water when they go to bed.

To chuse voluntary and procured Trances, as also fixed and profound Thoughts, so as they be without周恩来, I have nothing certain: no doubt they make to the intuition, and condense the Spirits, and that more poetically than Sleep, seeing they lay as deep, and suspend the spirits as much or more. Touching them, let farther inquiry be made. So far touching Sleep.

As for Motion and Exercise, Latitude hurteth, and so doth all Motion and Exercise, which is too nimble and swift, as Running, Tennis, Fencing, and the like; and again, when our strength is extended and strained to the uttermost, as Dancing, Wrestling, and such like: for it is certain, that the spirits being driven into freights, 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, Exercises which stir up a good strong motion, but not over-swift, or to our utmost strength, (such as are Leaping, Shooting, Riding, Bowling, 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 sense 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 affl:ct not too much, doth rather prolong life; for it doth freshen the spirits, and is a kind of condensation. Great Fears shorten the life: for though Grief and Fear do both freshen the spirits, 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 caustic the spirit to feed upon the juices of the body; but let loose and breaking forth, it helpeth: as those Physicians 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, keepeth no holidays.

Pity of another man's misfortune, which is not likely to befall our selves, is good:

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but Pity, which may reflect with some similitude upon the party pitying, is naught, because it excites Fear.

88. Light and shame hurtest not, seeing it contracts the Spirit a little, and then straight diffluffeth them: insomuch that homely persons commonly live long: but Shame 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 wounding, 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 extremity, like Gold.

91. Admiration and leaf 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 unquietly 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 taffed but lightly of things, and studied rather Exorrhon of speech than Prolfitude of matters, were also long-lived: as Gorgias, Irenocacias, Socrates, Seneca. And certainly, as old men are for the most part talkative, so talkative men do often grow very old; for it teateth a light contemplation, and such as doth not much stain the Spirit, or vex the mind; but fruitful, and acute, and eager inquisition shortens life; for it ticheth the Spirit, and wasteth 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 precedent distribution.

92. Special care must be taken that the Spirit be not too often resolved; for attenuation goeth before resolution, and the Spirit once cascuated doth not very easily retire, or is condenced. Now Resolution is cauèd by over-great labours, over-vexed and vehement affections of the mind, over great sweateth, over great evasions, 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 hystrions also advise) must be avoided.

93. The Spirit is delighted both with wanted things, and with new. Now it maketh wonderfully to the confirmation 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 dulness; 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, do to be ordered, that it may have many renovations, and the Spirit by perpetual converting in the same actions may not wax dull. For though it were no ill laying of sense's, The fool doth ever begin to live; yet this folly, and many more such, are good for long life.

94. It is to be observed touching the 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 theirREALS, lampish, and other indispension 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, temperatives 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 profession of busines. Yet men are worse, when they are meretric and best disposed, then to apply themselves to feastings,
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Venus, Labours, Endeavours, Business; whereas if they have a regard to long life, (which may seem strange:) they should rather practise the contrary. For we ought to cherish and preserve good spirits, and for the evil-disposed spirits to discharge and alter them.

Pecunia faith not unwisely, That old men, for the comforting of their spirits, ought often to remember and ruminate upon the Acts 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 visit the places of their education. Visitation 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 benign; therefore we should lead such a Youth and manhood, that our Old age should find new Solaces, whereas the chief is moderate ease: And therefore old men in honourable places lay violent hands upon themselves, who retire not to their ease: whereas may be found an eminent Example in Caffodoro, who was of that reputation amongst the Garibald 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 diseased: for in such bodies all mutation, though to the more benign, halifieth 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 contention: 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 aversion and unwillingness, doth free and deject them. And therefore it conferreth to long life, either that a man hath the art to infitute 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 special 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 Drunkennes and Melancholy.

Touching the Operation upon the Spirits, that they may remain youthful, and renew their vigour, thus much: which we have done the more accurately, for that there is, for the most part, amongst Physicians and other Authors, touching these Operations a deep silence; but especially, because the Operation upon the Spirits, and their making green again, is the most ready and compendious way to long life; and that for a two-fold compendiousness: one, because the Spirits work compendiously upon the body; the other, because Vapours and the Affections work compendiously upon the Spirits; so as they 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.
and hasten the Deficcation thereof; and therefore the Exclusion of it is effectual to length of life.

Another effect which followeth the Exclusion of Air is much more subtil and profound, namely, that the Body closed up, and not perspiring by the pores, detaineth the spirits within, and turneth it upon the harder parts of the body, whereby the spirits mollifies and internerates them.

Of this thing the reason is explained in the Deficcation of Inanimate Bodies; and it is an Axiom almost infallible, That the Spirit discharged and suffused forth, drieth Bodies; detained, melteth and internerates them. And it is further to be affirmed, That all Heat doth properly attenuate and moisten, and contracteth 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 stirred up by heat. Certainly, if a man shall recal things past to his memory, it will appear that the spirits 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 likewise, that the life of Columnar Authorites was a thing resembling the life in Caves, in respect the Sun-beams could not much pierce thither, nor the Air receive any great changes or inequalities. This is certain, both the Simeon Stelites, as well Daniel as Saba, and other Columnar Authorites, have been exceeding long liv'd. Likewise the Authorites in our daysies, 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 underfoot of a Mountain where the Air is clear and pure; namely, whether by reason of the decline of the Vail, Clouds and Vapours do not ascend; as it is in the Mountains which encompass the Barby, 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, wawthing in cold water, Astringents applied to the skin, such as are Ma-fick, Myrthe, byrte.

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 skiin.

As for filling up the Pores, Paintings and such like Odious dashing, and (which may most commodiously be used) Oil and fat things, do not so confine the substance of the body, than Oil-colours and Varnish do preserve Wood.

The ancient Britains painted their bodies with a god, and were exceeding long liv'd; the Picts also used paintings, and are thought by some to have derived their name from thence.

The Kraelians and Virginians paint themselves at this day, who are (especially the former) very long liv'd; infomuch that five years ago the French Sepuets had speech with one 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 Oyl without, and by honey within.

The Irish, especially the Ulde-irish, even at this day live very long; certainly they report, that within these few years the countes of Desmonde lived to an hundred and forty years of age, and bred Teeth three times. Now the Irish have a fashion to chafe, and, as it were, to battle themselves with old Salt-butter against the fire.
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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 belt thing for the skin, and the comforting of the flesh, seeing it is both notably Astringent, and hath besides an Oleosity and subtile heat, without any Acrimony. I remember a certain Episthman, who when he went to Sea carried a bag of Saffron next his Romack, that he might conceal it, and so escape Custom; and whereas he was wont to be always exceeding Sea-fish, at that time he continued very well, and felt no provocation to vomit.

Hippocrates advised in Winter to wear clean Linen, and in Summer foul Linen and beincerared 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 conduct to long life. The anointing would be done every morning when we rise out of bed, with Oil in which a little vinegar 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 somewhat from the body; but contrarily, in small quantities are drunk in by the body: therefore the anointing would be but light, as we said, or rather the shirt it self would be beincerared with Oil.

It may happen to be objected, that this anointing with Oil, which we commend, (though it were never in use with us, and amongst the Italians is cast off again) was anciently very familiar amongst the Grecians and Romans, and a part of their Diet; and yet men were no longer liv'd in those days than now. But it may rightly be answered, Oil was in use only after Baths, unless it were perhaps amongst the Romans: now hot Baths are as much contrary to our operation, as anointings are congresous, 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 bell of all. Besides, the anointing amongst them was used only for deceit, 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 such,

--- Nec Casili liquidi corruptus usus Olivi, Thar cordebant Casii hacte non suplantent 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 prejudicial.

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 ingender discases 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 advance health, and derogate 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 that in, and not breathing forth, acquire heat. This inconvenience may be prevented, if the Diet most usually incline to the colder part, and that at times some proper cooling medicines be taken, of which we shall shortly speak in the operation upon the blood.

The third is, that it may annoy the head; for all Opoleism from without strikes back the vapours, and sends them up unto the head. This inconvenience is remedied by Purges, especially Clysters, and by slitting the mouth of the Romans strongly with Stipticks, and by combing and rubbing the head, and by washing it with convenient Licsis, that something may exhale, and by not omitting competent and good exercises, that something also may perspire by the skin.
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25. The fourth Inconvenience is a more subtil Evil, namely, that the Spirit being detained by the cloying up of the Power, is likely to multiply itself too much; for when little issue 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 it 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 Roses and Myrtles; for we must altogether disclaim hot things, as we said of Coffee.

Neither will it be unprofitable to wear next the body Garments that have in them some Undertone or Clees, not Aqueous, for they will exhaust the body less; 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 Man, 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 weather parts as on the upper.

It is also to be observed, that Air accustomed to the body doth less 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 sheets, 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 satisfaction both sides. This may be done by removing our habitation four times a year, at constant and fast times, unto convenient seats, that so the body may neither be in too much perspiration, nor in too muchitation. 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.

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The following Operations answer to the two precedent, and are in the relation of Puffers and Affires: 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 depredatable. 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 Intention, 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, Calfers, not purging at all, or abstaining, but only cooling, and somewhat opening: those are approved which are made of the Juices of Lettuce, Purslane, Liver-wort, Houseflesk, and the Mustage of the head of Flea-wort, with some temperate opening decoction, and a little
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little Camphire: but in the declining age let the Honack, and Fiorians be left out, and the juices of ngorage and Endive, and the like, be put in their rooms. And let these Chylers 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 Ensomliets, as Mallow, Mercury, Oil, and the like; rather take new water in some good quantities, and so.

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 thickneres, 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 cloatheth the body too strongly, it is so far from furthering coolness, that it rather forbids, and stirs 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 begeth not to the quality of the blood, but to the substance thereof, that it may be made more firm and less dispensible, and such, as the heat of the spirit may have the less power over it.

And as for the use of Figuses of Gold, Leaf-gold, Powder of Pearl, Precious Stones, Coral, and the like, we have no opinion of them at this day, unless it be only as they may satisfie this present Operation. Certainly, seeing the Arabians, 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 fantastical 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 resift Intercution, but Atection 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 condivision. Secondly, that such hard and solid things be void of all malignant qualities, lest while they be dispersed and lurk in the veins, they breed some ill convenience. 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 Membrane. 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 nite nine, a little Oil of Almonds mingled therewith, Elevcs used immediately upon the taking of them. The Simples which may satisfie this Operation are, in stead of all, Gold, Pearls, and Coral: for all Metals, except Gold, are not without some malignant quality in the dissolutions of them, neither will they be bene to that exquisite finenes of Leaf-gold hath. As for all glassy and transparent Jewels, we like them not, (as we said before,) for fear of Coronion.

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 easy entrance into the veins, and not be avoided in excrements. The Woods fit for this purpose are Sander, the Oak and Vine. As for all hot woods or something Reoines, we reject them: notwithstanding, you may add the woody Flakes of Roeomy dried, for Roeomy is a Shrub, and exceedeth in age many Trees; also the woody Flakes of Ivy, but in such quantity as they may not yield an unpleasing taste.

Let the Woods be taken either boiled in Broths, or infused in Muff or Ale before they leave working: but in Broths (as the custom is for Quassias and the like) they would be infused a good while before the boiling, that the former 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 ordered therefore, that the juice of the body be somewhat hard, and that it be fatty or subfused.

3. As for hardnes, it is caused three ways: by Aliment of a firm nature, by cold condensing the skin and flesh, and by Exercise, binding and compacting the juices of the body, that they be not soft and frothy.

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, Dear, Goat, Kid, Swan, Goose, Ring-dove, especially if they be a little powdered; Fish likewife salted and dried, Old Cheafe, and the like.

5. As for the bread; Oaten-bread, or bread with some mixture of Peafe in it, or Rye-bread, or early-bread, are more solid than wheat-bread, and in wheat-bread, the coarse wheat-bread is more solid than the pure Mancetter.

6. The Inhabitants of the Orcades, which live upon salted fish, and generally all Fish-eaters, are long-liv'd.

7. The Monks and Hermites which fed sparingly, and upon dry Aliment, attained commonly to a great age.

8. Also pure water usually drunk makes the juices of the body less frothy than unto which if, for the dulness of the spirits, (which no doubt in Water are but a little penetrative) you shall add a little Nitre, we conceive it would be very good. And touching the firmnes 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 Hones; 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; use of 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: robife exercise (so it be without over-much Sweating or Wearies) maketh it hard and compact. Also exercise within cold Water, as swimming, is very good; and generally exercise abroad is better than at within houes.

13. Touching Frictions, (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 hardning the juices of the body, we are to come next to the Oleifity and Fattiness of them, which is a more perfect and potent Intention than induration, because it hath no inconvenience or evil annexed. For all those things which pertain to the hardning of the juices are of that nature, that while they prohibit the absumtion of the Aliment, they also hinder the operation of the fame; whereby it happens, that the same things are both propitious and adversive to length of life: but those things which pertain to making the juices Oily and Rosed, 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 Rosed and Fat, it is to be noted that we mean it not of a visible Fat, but of a Dewines dispersed, or (if you will call it) Radical in the very subsulance of the body.

16. Neither again let any man think, that Oil or the Fat of Meats or Marrow do engender the like, and satisfy our intention: for those things which are once perfect are not brought back again; but the Aliments ought to be such, which after digestion and maturation do then in the end engender Oleosity in the juices.

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 longer in consuming then Water, so in Paper or Linnen it sticketh longer, and is later dried, as we noted before.

To
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 drie 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, Pistachios, Dates, Raisins of the Sun, Cornuts, Figs, and the like. Contrarily, all sour, and very salt, and very biting things are opposite to the generation of Rased Juice.

Neither would we be thought to favour the Manickets, 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 makes 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 acrimony or sourness are notwithstanding subtle: such are those Wines which are (as the old woman said in Plantus) vetusta edentulis, toothless with age, and Ale of the same kind.

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 Cyprians extract out of it, which will dissolve metals) it would be better to take the fame portion of Sugar, not lightly infused in it, but so incorporated as Honey useth to be in Mead, and to keep it to the age of a year, or at least six months, whereby the Water may lose the crudity, and the Sugar acquire subtlety.

Now ancientness in Wine or Beer hath this in it, that it ingenders subtlety in the parts of the Liquor, and acrimony 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 Malt, Swine-stibs or Deer-stibs well boiled, that the Spirits of the Wine may have whereupon to runmate and feed, and so by aiding their mordacity.

In like manner, if Ale 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 the grains) of some root-private, as are Potato-roots, Pith of Artichokes, Burre-roots, or some other sweet and efficent roots; we suppose it would be a more useful drink for long life than Ale made of grasses only.

Also such things as have very thin parts, yet notwithstanding are without all acrimony or mordacity, are very good Sallets: which vertue we find to be in some few of the Flowers: namely, Flowers of Ivy, which infused in Vinegar are pleasant even to the taste; Marigold leaves, which are used in Broths; and Flowers of Betony. And touching the operation upon the juices of the Body thus much.

The Operation upon the Bowels for their Extrusion of Aliment. 5.

W hat those things are which comfort the Principal Bowels, which are the fountains of Concoctions, namely, the stomatch, 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 Physicians, and from their Prefepts and Advices.

Touching the Spleen, Gall, Kidneys, Mcienteries, 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 repARATION by aliments, and retardation of the incocion of old age; if the Concoctions and

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3. For futhermore bcfidcs, take laftly, not not comfort hour mahl cooling may than yellow but Oil which function that mca!

4. A Oil in which Golden hath been quenched, I conceive, would be very good once in a meal; not that I believe the Gold conferreth any vertue thereunto, but that I know that the quenching of all Metals in any kind of liquor doth leave a moft potent affinity: Now I chuse Gold, because besides that Attraction which I desire, it leaveth nothing else behind it of a metallic impression.

5. I am of opinion, that the tops of bread dipped in wine, taken at the midft of the meal, are better than wine iffelf; especialy 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 flipp too falt.

6. It is certain that the use of Quinces is good to strengthen the stomach; but we take them to be better if they be used in that which they call Quiddeny of Quinces, than in the bodies of the Quinces themselves, because they lie heavy in the stomach.

7. Such things as are good for the stomach above other Simples are these, Rosemary, Elecampane, Maflick, Wormwood, Sage, Mint.

8. I allow Pills of Aloes, Maflick and Saffron in Winter time, taken before dinner; but fo, as the Aloes be not only oftentimes wafted in Safe-water, but also in Vinegar in which Tragacanth 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.

9. Wine or Ale wherein Wormwood hath been infused, with a little Elecampane and yellow Sauders, will do well, taken at times, and that especially in Winter.

10. But in Summer, a draught of White-wine allayed with Strawberry-water, in which Wine Powder of Pearls and of the shells of crufhipes exquitely beaten and (which may perhaps seem strange) a littlechalk have been infused, doth excellently refresh and strengthen the stomach.

11. But generally, all Draughts in the morning (which are but too frequently used) of cooling things, as of Juices, Decoctions, Whey, Barly-waters, and the like are to be avoided, and nothing is to be put into the stomach fafting 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 breakfalt.

12. Often fastings are bad for long life; besides, all thift is to be avoided, and the stomach is to be kept clean, but always moist.

13. Oil of Olives 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.

14. A small bag filled with locks of Scarlet-wool steeped in Red-wine, in which...
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Myrtle, and Citron-pill, and a little saffron have been infused, may be always worn upon the stomach. And touching those things which comfort the stomach thus much, seeing many of those things also which serve for other operations are helpful to this.

The Liver, if it be preferred from Torrefaction, or Desiccation, and from Obstruction, it needeth no more; for that loosens of it which begets Rheumatisms 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 Pomegranates, 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-pill green, and three or four whole Cloves: let this be taken from February till the end of April.

Bring also into use above all other Herbs Water-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.

Aloe, however washed or corrected, is hurtful for the Liver, and therefore it is never to be taken ordinarily. Contrariwise, Echinaria 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 Strepity thereof. Secondly, that it be macerated an hour or two in Oil of sweet Almonds newly 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 a little Balsam, that it carry not away the lighter parts only, and make the masts 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 spoonsfulls of Oil of sweet Almonds newly drawn ever go before, and the motion of the Body, especially of the arms and sides, constantly follow.

Sweetened Liquors, and that with some spices, are principally, and not a little effectual to prevent the Arefation, and Salines, and Torrefation, 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 Raphis of the Sun new, Frument, dried Eggs, Dates, Parslips, Potatoes, and the like, with the mixture of Lithos sometimes: also a Jupiter of the Indus grain, (which they call mixt) 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 faintness, 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 the 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 Burre-rots boiled and served in after the same manner; also Broths in the Spring-time of Vine-kinds, and the green blades of wheat. 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 Affections. Now many of those things which have been formerly spoken touching the Spirits may be transferred hither; but that digested 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 forthe the Heart, especially if they be of that kind, that they do not so much relish the particular poylons as arm the heart and spirits against poylons 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
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Wild Thyme, and Eye-bright, and a kind of Marjoram, and here and there stalks of Calaminth; which is not altogether void of wood, but conveniently set with some Trees for shade; where the Sweet-briar-rose finiseth 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 forest and calm sky; but the best is, the wind blowing from the West in the morning, and from the North in the afternoon.

Odours are especially profitable for the comforting of the heart, yet not so as though an odour were the prerogative of a good air: for it is certain, that as there are some Pestifential airs which smell not so ill as others that are less hurtful; so, on the contrary, these are some airs most wholesome and friendly to the spirits, which either smell not at all, or are less pleasing and fragrant to the sense. And generally, where the air is good, odours should be taken but now and then; for a continual odour, though never so good, is burdensome to the spirits.

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, Gilflowers, Vines, Bees-flowers, Lime-tree-blossoms, Five-buds, Honey-suckles, 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, wild Mint, 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 finells 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 Claret-wine, 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 claret-wine be poured thereon.

Orange-flower-wine, pure and good, with a small portion of Rose-water and Brick wine, snuff’d up into the nostrils, or put into the nostrills with a Spring, after the manner of an Erythine, (but not too frequently) is very good.

But Channel (though we have no Beete) 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-griese, 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 Balsam.

The Vapours which arising from things inwardly taken do fortifie and cherish the heart ought to have these three properties, that they be Friendly, Clear, and Cooling; for hot Vapours are naught, and Wine it self, 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 fincky, or fuliginous, or incoent, but moist and equal.

Out of that unprofitable rabble of Cordials, a few ought to be taken into daily diet: instead of all, Amber-griese, Saffron, and the grain of Kermes, of the hotter sort; Roots of Angelica and Barrage, Citrons, Sweet Limes, and Pears, of the colder sort. Also that way which we said, both Gold and Pearl work a good effect, not onely within the veins, but in their passage, and about the parts near the heart; namely, by cooling, without any malignant quality.

Of Beer, 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 he communicated to the spirits: therefore we approve not the taking of it in Broths or Syrups, or in Rose-water, or any such like; but onely 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 onely add this, That every Noble, and Resolute, and (as they call it) Heroical Defe, strengtheneth and inlargeth the powers of the Heart. And touching the Heart thus much.
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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 part in the custody of the Stomach; and therefore those things which comfort and strengthen the Stomach do help the Brain by content, and may no less be transferred hither. We will add a few Observations, three Outward, one Inward.

We would have basting of the Feet to be often used, at least once in a week: and the Bath to be made of faire with Bay salt, and a little Sage, chamomile, Fennel, Sweet-marjoram, and Pepper-wort, with the leaves of Angelica green.

We commend also a fume or Suffumigation every morning of dried Rosemary, Bay-leaves dried, and Lignum-Aloes: for all sweet Gams oppress the head.

Especially care must be taken that no hot things be applied to the Head outwardly; such as all kind of Spices, the very Nutmeg not excepted: for those hot things we debaie 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 Roses, 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 condense the spirits; we think it not impertinent to that effect, that once in fourteen days broth be taken in the morning with three or four grains of Caferorum, and a little angelica-sauded, and calamus, which both fortifie the brain, and in that aforesaid density of the substance of the spirits, (so necessary to long life) add also a vivacity of motion and vigour to them.

In handling the Comforters of the four principal Bowels, we have propounded those things which are both proper and choice, and may safely and conveniently be transferred into Diets and Regiment of life: for variety of Medicines is the Daughter of Ignorance; and it is not more true, that many Diseas have caused many Diseases, as the Proverb is, than this is true, that many Medicines have caused few Cures. And touching the Operation upon the principal Bowels for their Extraction of Aliment, thus much.

The Operation upon the Outward Parts for their Attraction of Aliment. 6.

The History.

Although a good Concoction performed by the Inward Parts be the principal towards a perfect Alimentation; yet the Actions of the Outward Parts ought also to concur; that like as the Inward Faculty sendeth forth and extrudeth the Aliment, so the Faculty of the Outward Parts may call forth and attract the same: and the more weak the Faculty of Concoction shall be, the more need is there of a concurring help of the Attractive Faculty.

A strong Attraction of the outward parts is chiefly caused by the motion of the Body, by which the parts being heated and comforted, do more cheerfully call forth and attract the Aliment unto themselves.

But this is most of all to be foreseen and avoided, that the same motion and heat which calls the new 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 Attraction of the outward parts make them by Perspiration dry and juicelose.

The next is Exercise, (by which the parts confricate and chafe themselves) so it
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be moderate, and which (as was noted before) is not swift, nor to the utmost strength, nor unto wearines. But in Exercise and Frication 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 Frication is, but in vehement Exercise Unction is to be used both in the beginning and in the end, as it was ancietly 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 Railings, or of Figs, or the like; but of plain Meat and Drink, yet that very light, and in moderate quantity.

Exercise 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, falling only in sleep.

Those things which are used to Mortification may be transferred to Viscitation: for both Hair, shirts, and Seourings, and all vexations of the outward parts, do fortifie the Attractive force of them.

Cardan commends Nettling, even to let out Melancholly: 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 use breed Itches and other diseases of the skin. And touching the Operation upon the outward Parts for their Attracive of Aliments, thus much.

The Operation upon the Aliment it Self for the Infimation thereof. 7.

The History.

The vulgar reproofe touching many Dishes doth rather become a severe Reform than a phyfician: or howover it may be good for preservation of health, yet it is hurtful to length of life, by reason that a various mixture of Alments, 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 changing of Dishes, according to the Seasons of the year, or upon other occasions.

Alfo, 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 conducfe both to health and to long life.

It must be ordered, that with Meats hard of digestion be conjeyed strong Liquors and Sauces that may penetrate and make way; but with Meats more easie of digestion, smaller Liquors and fat 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 Battery; yet it is of more consequence than those Fables of Gold and precious Stones, and the like.
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The moistening 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 averse to rigid 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 corned; the less Salt may be spent at the table with them, or none at all: for Salt incorporated with the meat before is better distributed in the body, than eaten with it at the table.

There would be brought into use several and good Macerations, and Infusions of Meats, in convenient Liquors, before the roasting of them: the like whereof are sometimes in use before they bake them, and in the Pickles of some Fishes. But beatings, and as it were scourings, of flesh-meats before they be boiled, would work no small matter. We see it is confessed that Partridges and Pheasants killed with an Hake, also Ducks and Stags killed in hunting, (if they stand not out too long;) eat better even to the table; and some Fishes scourged and beaten, become more tender and wholesome; also hard and four Peers, and some other Fruits, grow sweet withrowling 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 wines, Ale, Mead, and the like;) this one thing is to be observed and puriled, as the sum of all, That the parts of the Liquor may be exceeding thin and subtle, and the Spirit exceeding mild. This is hard to be done by age alone, for that makes the parts a little more subtile, but the spirits much more sharp and eager: therefore the Infusions in the Vessels of some fat substance, which may refresh the acrimony of the spirits, counsell 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 stirring them, or some such other way: for it is certain that this local motion doth both vivify the parts, and doth so incorporate and compact the spirits with the parts, that they have no leisure to turn to sounness, which is a kind of purgation.

But in extremely old age such a preparation of meats is to be made as may be almost in the middle way to etsus. 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 etsus: 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 Aisu or Ale before it hath done working, with a little Sugar.

Also Gravies of meat, and the mincings of them small well seasoned, 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 thereto. First, that new teeth may put forth; which seems altogether difficult, and cannot be accomplished without an inward and powerful restitution of the body. Secondly, that the farts be so confirmed by due stimulants, that they may in some sort supply the office of the Teeth; which may possibly be effected. Thirdly, that the meat be so prepared, that there shall be no need of chewing; which remedy is ready at hand.

We have some thought also touching the Quantity of the meat and drink, that the same taken in a larger quantity at some times is good for the irigation 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 is self rather needs Explication, than any various Rules.

1. 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 up 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 Grosse body, and made ineffectual, is somewhat freed and stirred up by the heat and surrounding Spirit, so that it is then actuated: which is the only cause why Inanimates assimilate not, and Animates assimilate.

This also is certain, that the harder the Confinement of the body is, the more doth that body stand in need of a greater heat to prick forward the assimilation: which falls out ill for old men, because in them the parts are more obstinate, and the heat weaker; and therefore either the obstinacy of their parts is to be softened, or their heat increased.

And as touching the malacification or mollifying of the members, we shall speak afterward, having also formerly propounded many things which pertain to the prohibiting and preventing of this kind of hardness. For the other, touching the increasing of the heat, we will now deliver a single precept, after we have first assimilated this Axiom.

The Act of assimilation (which, as we said, is excited by the heat circumstanced) is a motion exceeding accurate, subtle, and in little; now all such motions do then come to their vigour, when the local Motion wholly ceaeth which disturbed it. For the motion of Separation into homogenous 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 Fusion proceed in Water or mixt Bodies, if the fame be in continuall Local Motion. So then, from this Assumption we will conclude this for the present Inquisition.

The Act it self of Assimilation is chiefly accomplished in Sleep and Rest, especially towards the morning, the distribution being finished. Therefore we have nothing else to advise, but that men keep themselves hot in their sleep; and further, that towards the morning there be set some Anointing, or shirt tinted with Oyle, 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 Arefed, or the Malacification of the Body. 9.

We have inquired formerly touching the Inteneration from within, which is done by many windings and Circuits, as well of Alimentation as of Detaining the Spirit from emitting forth, and therefore is accomplished slowly. Now we are to inquire touching that Inteneration which is from without, and is effected, as it were, suddenly; or touching the Malacification and Suppling of the Body.

The History.

In the Fable of restoring Pelias to youth again, Medea, when she feign'd to do it propounded this way of accomplishing the same, that the Old man's body should be cut into several pieces, and then boiled in a Cauldon with certain Medicaments. There may, perhaps, some boiling be required to this matter, but the cutting into pieces is not needful.

Not.
Notwithstanding, this cutting into pieces seems, in some sorts, to be useful; not
with a knife, but with judgment. For whereas the Consciense of the
Baths and
Parts is very diverse, it is necessary that the intercession of them both be not effectu
the same way, but that there be a Cure designed of each in particular; besides those things
which pertain to the intercession of the whole mas 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, Unction, and the like; concerning which these things that follow are to be
oberved.

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 Mixture of
Inanimates, by which they are internerated, 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 Circum-
ference.

Therefore the Empoliant Baths which are in use do little good, but on the contrary
hurt, because they rather draw forth than make entrance, and reolve the Structure of
the body rather than consolidate it.

The Baths and Unction which may serve to the present Operation (namely, of
interneration of the body truly and really) ought to have three properties.

The first and principal is, That they consist of those things in their whole
substance are like unto the body and flesh of man, and which have a feeding and nourish-
ning virtue from without.

The second is, That they be mixed with such things as through the subtilty of their
parts may make entrance, and so intitrate 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 Astringent; I mean not four or tarr things, but unctuous and
comforting; that while the other two do operate, the exhaling out of the body, which
destroyeth the virtue of the things internerating, may (as much as is possible) be pro-
hibited; and the motion to the inward parts, by the Aftillation of the skin and closing
of the passages, may be promoted and furthered.

That which is most consubstantial to the body of man is warm Blood, either of man,
or of some other living creature: but the device of Ficinus, touching the sucking of
Blood out of the arm of a wholesome young man, for the restauration of strength in
old men, is very frivolous; for that which nonrieth from within ought no way to be
equal or homogenous to the body nourished, but in some sort inferior and inor-
dinate, that it may be converted: but in things applied outwardly, by how much the
substance is finer, 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 putrefied; insomuch that this thing hath begot envy
towards some Kings from the common people.

It is reported that Herachitus, for cure of the Dropste, was put into the warm belly of an
exceedly thin.

They use the Blood of Kilins warm to cure the disease called St. Anthony's Fire, and
to restore the flesh and skin.

An Arm or other Member newly cut off, or that upon some other occasion will not
leave bleeding, is with good successe put into the belly of some creatures newly rippel
up, for it worketh potently to stanch the blood; the blood of the member cut off by con-
sent sucking in, and vehemently drawing to it self, the warm blood of the creature them,
whereby it self is stoppeth and retireth.

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 ease. This is imputed vulgarly as if
they should draw down the malignity of the disease; but howsoever, this application
goth to the Head, and comforteth the Animal Spirits.

But these bloody Baths and Unctions seem to us fluctuating and odious: let us search
out some others, which perhaps have left loathsome effects in them, and yet no least
benefit.
Next unto warm Blood, things alike in substance to the Body of a man are nutritious: such as hooks of Oven, Smoke, Deer; eaters amongst fishes; Milk, Butter, Yolks of Eggs, Flower of H beast, sweet wine, either Sugred, or before it be fined.

Such things as we would have mixed to make impressure are, instead of all, Salts, especially Ray salt; also Wine (when it is full of spirit) maketh entrance, and is an excellent Convery.

Astringents of that kind which we described, namely, unctuous and comfortable things, are Saffron, Mullick, Myrrhe, and Myrtle berries.

Of these parts, in our judgment, may very well be made such a Bath as we design: Physicains and Pofterity will find out better things hereafter.

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.

First, that there go before the Bath a Friction of the body, and an Anointing with oil, with some thickening substance, 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 sometwo hours. After the Bath, let the body be Emplastered with Mullick, Myrrhe, Tragacanth, Diapalnta, and Saffron; that the perspiration of the body may (as much as is possible) be inhibited, till the supple matter be by degrees turned into fold: This to be continued for the space of twenty four hours or more. Lastly, the Emplastering being removed, let there be an anointing with oil mixed with sale and Saffron. 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.

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.

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.

Neither ought the warmths and cherishings of living bodies to be neglected. Vicious 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 maid, after 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.

Earbaroffa, in his extreme old age, by the advice of a Physician, a Jew, did continually apply young Boys to his stomach and belly, for warmth and cherishing; also some old men lay Whelps (creatures of the hottest kind) close to their flomachs every night.

There hath gone a report, almost undoubted, and that under several names, of certain men that had great Noises, who being weary of the decitation of people, have cut off the bunches or hillos of their Noises, and then making a wide gash in their arms, have held their Noises in the place for a certain time, and so brought forth fair and comely Noise: Which if it be true, it drews plainly the content of flesh unto flesh, especially in live fleshes.

Touching the particular Intemeration of the principal bowels, the Stomach, Lungs, Liver, Heart, Brain, Marrow of the back bone, Guts, Reins, Gall, Veins, arteries, Nerves, Cartilages, bones, the Inquisition and Direction would be too long seeing we now set not forth a Pratich, but certain Indications to the Pratich.
The History of Life, and Death.

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 set 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 Bone and Membranes, and like parts of the body.

It is certain that Diets which are now much in use, principally of Chamomile, and of Sanforilla, China, and Saffrason, if they be continued for any time, and according to strict rules, do first attenurate 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 marrow of the body, may be effectually cured. And farther, because it is manifest that men who by these diets are brought to be extrem 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 Serpent.

We do confidently affirm, (neither let any man reckon us among those Heretics which were called Cathars) 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 Intercration of the body, and Opplation of the passages from without, and Exclusion of air, and Detaining of the spirit within the mass of the body, do much conduce to long life. For it is most certain, that by Sweats and outward Perspirations not only the Humours and excrementitious vapours are exhale 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 lets; 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 Intentions 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 Admireable 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 unto men at the point of Death, both a little before and after: that seeing there are many Paths which lead to Death, it may be understood in what Common Way.
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 Fit Aliments. Flame seems to stand in need but of two of these; namely, Motion and Aliments; because Flame is a simple substance, the Spirit a compounded, inasmuch that if it approach somewhat too near to a flamy nature, it overthwart the Spirit.

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 frighten'd, is extinguish'd: as we may see in a Candle having a Glass cast over it; for the Air being dilated by the heat, doth conduce and thrust together the Flame, and so lesseneth it, and in the end extinguisheth it; and fires on hearths will not flame if the fuel be thrust close together without any space for the Flame to break forth.

4. Also things fired are extinguish'd with compreッション; as if you press a burning coal hard with the Tongs or the foot, it is freight extinguish'd.

5. But to come to the Spirit: if Blood or Phlegm get into the Ventricles of the Brain, it causeth sudden death, because the Spirit hath no room to move it self.

6. Also a great blow on the head induceth sudden death, the Spirits being frighten'd within the Ventricles of the Brain.

7. Opium and other strong Stupefactive do coagulate the Spirit, and deprive it of the motion.

8. A venemous Vapour, totally abhorred by the Spirit, causeth sudden death: as in deadly poisons, which work (as they call it) by a specific 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 detest'd.

9. Also extreme Drunkenness or extreme Feeding sometime causeth sudden death, seeing the Spirit is not solely oppressed with over-much condensation, 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 Compreッション, 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 Dropfel, the waters flow forth abundantly; much more in great and sudden fluxes of blood oftentimes prevent death followeth: and this happens by the mere flight of Vacكم within the body, all the parts moving 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 causeth sudden death, as in all suffocation or strangling. Now it seems this matter is not so much to be referred to the impediment of Motion, as to the impediment of Refrigeration; for air over-hot, though attracted freely, doth no less 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 plaster'd in close chambers where a fire is made: which kind of death is reported to have been the end of the Emperor Jovian. The like happeneth from dry Baths over heated, which was practis'd 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 which
which the defireth to expel, the foggy air drawn into the Lungs, and to take in new, scarce the third part of a minute.

Again, the besting of the Life, and the motion of the Splene and Diaphragm 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.

Amongst living Creatures, even of those that have Lungs, there are some that are able to hold their breaths a long time, and others that cannot hold them so long, according as they need more or less refrigeration.

Fishers 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 cold; so Fishers are suffocated in waters if they be totally and long frozen.

If the Spirit be assaulted by another heat greater than it self, it is dissipate 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 dissipation.

The want also and use of Sleep is referred to Refrigeration. For Motion doth attenuate and rarifie the spirit, and doth sharpen and increaseth 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 living 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 live hours at the least: though there are, even in this kind, sometimes miracles of Nature; as it is recorded of Jesu Christ, that he slept not for a long time before his death. And as touching the want of Refrigeration for conserving of the Spirit thus much.

As concerning the third Indigence, namely of Aliment, it seems to pertain rather to the parts than to the living Spirit; for a man may easily believe that the living Spirit subsisteth in Identity, not by succession or renovation. And as for the reasonable Soul in man, it is above all question that it is not 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 differs from that other Soul essentially and formally. For out of the confusion of these that fame transmigration of Souls, and innumerable other devices of Heathens 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 doth work much even in this case: but in sickness 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 sustaine 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 Abjuration; but Living bodies not above three days, (as we said) unless they be repaired by nourishment: which they do that quick Abjuration to be the work of the living Spirit, which either repairs it self?, or puts the parts into a necessity of being repaired, or both. This is testified by that also which was noted a little before, namely, that living Creatures may subsist somewhat the longer without Aliment if they sleep; now Sleep is nothing else but a reception and retirement of the living Spirit into it self.

An abundant and continual effusion of blood, whichsometimes happeneth in the Hemorrhoids, sometimes in vomitting of blood, the inward Veins being unlocked or broken, sometimes by wounds, causeth sudden death, in regard that the blood of the Veins ministreth to the Arteries; and the blood of the Arteries to the Spirit.
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 subsistence of the body. It is true; but consider then that this addition is made twice a day, and yet the body abounds 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, but to 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 wax, neither can men live upon herbs alone. And from hence comes the Incontinentia 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 it self in the Ventricles of the Brain and Nerves even continually, of the motion of the Heart every third part of a moment, of breathing every moment, of sleep and nourishment once within three 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; Distillation 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 is self is not 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 obsequiousness. So then, as Flame is a momentary substance, Air is a fixed substance, the Living Spirit is everlasting both.

Touching the extinguishing of the Spirit by the destruction of the Organs (which is caused by Diseases and Violence) we enquire not now, as we foretold in the beginning, although that also endeth in the same three Porches. And touching the Form of Death it self them much.

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 tenebrosis, 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 Sphygm and Dipsys thereof are almost confounded. There is also conjoin'd in the Pulse a weakness and lowness, and oftentimes a great intermission, because the motion of the Heart faileth, and is not able to rise against the attain'd stoutly or constantly.

The immediate proceeding signs of Death are, great unquietness and toasting in the bed,umbling with the hands, catching and grasping hard, gnawing with the teeth, speaking hollow, trembling of the nether lip, pulsens of the face, the memory confus'd, speechless, cold sweats, the body shooting in length, lifting up the white of the eye, changing of the whole visage, (as the note sharp. eyes hollow, cheeks fallen) contraction and doubling of the coldness in the extreme parts of the body; in some, shedding of blood or sperm, shrieking, breathing thick and short, falling of the nether 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 Joynys, an inability of the body to support it self upright, streeness of the Nerves and parts, extreme coldness of the whole body; after a little while, purreflation and finking.

Eels, serpents and the Isehfa will move a long time in every part after they are cut slaughter, incomuch that Country people think that the parts thrive to joyn together again. Also birds will flutter a great while after their heads are pulled off; and the hearts of living creatures will pant a long time after they are plucked out. I remember I have seen the heart of one that was bowelled, as suffering for High Treason, that being cast into the fire, leaped at the first at least a foot and half in height, and after by degrees lower and lower, for the space, as 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 th"
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 laid to be more credible than that of the 6x in Sacrific, 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 reviving those again which fall into sudden Swooning and Cateleyes of afeemtions, (in which Fits many, without present help, would utterly expire) these things are used; Putting into their mouths Water distilled of Wine, which they call Hot-waters, and Cordial waters, bending the body forwards, 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 calling of cold water upon the face, thricking out aloud and suddenly; putting Rose-water to the nostrils with Vinegar in fountains; 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.

There 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 strulling of the body within the Coffin; whereas of the most recent and memorable example was that of Joannes Scottus, called the Subtil, and a School. man, who being dug up again by his Servant, (unfortunately absent at his burial, and who knew his Master 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 Swooning. 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 Frications 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.

Theadder 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 Pap, to put forth Teeth the first time about the second year of age, to begin to go, to begin to speak, to put forth Teeth the second time about seven years of age, to come to Puberty about twelve or fourteen years of age, to be able for generation and the flowing of the 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 slow of motion; a young man hath...
hath good digestion, an old man had; a young man's bowels are soft and succulent, an old man's flat and parched; a young man's body is erect and freight, 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 phlegmatick and melancholick, and his blood inclined to coldness: a young man ready for the act of venes, an old man flow unto it: in a young man the juices of his body are more fossil, in an old man more crude and waterish; the spirit in a young man plentiful and boiling, in an old man scarce and jIJune: a young man's spirit is dene and vigorous, an old man's eager and rare; a young man hath his senses quick and intire, an old man dull and decayed; a young man's teeth are strong and entire, an old man's weak, worn, and fall out: a young man's hair is coloured, an old man's (of what colour focver 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 freth colour, an old man's pale, or with a black blood; 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 only sometime in Fatness; whereas the reason is soon given, Because old men's bodies do neither perspire well, nor assimi- late 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 humour, 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, Drinckes in the coming on of years doth forge oldness: and bodies when they come to the top and strength of heat do decline in Drinckes, and after that follows Coldness.

Now we are to consider the Affections of the Mind. I remember when I was a young man, at Posthiers 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 lees 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 purefections of their Bodies: For the drinckes of their skin he would bring in Impudence; for the hardnes of their bowels, immersifihed: for the lippitude of their eyes, an evil Eye and Envy: for the swelling down of their eyes, and bowing their body towards the earth, Abuse; (for, faith he, they look no more up to Heaven as they are wont) for the trembling of their members, Inresolution of their decrees and light inconstancy; for the bending of their fingers, as it were to catch. Rapacity and covetousness; for the buckling of their knees, farrhifheds; for their wrinkles, fraftifhnes and Obliquity; and other things which I have forgotten. But to be serious, a young man is modest and shamefaced; an old man's fore-head is hardened; a young man is full of bounty and mercy, an old man's heart is branny; 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 piety 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 con- vention, wisdom for his own self, and seeking his own ends; a young man is confident and full of hope, an old man diffident and given to suspect most things; a young man is gentle and obsequious, an old man froward and disdainful; a young man is sincere and open-hearted, an old man cautious and close; a young man is given to define great things, an old man to regard things necellary; a young man thinks well of the present times, an old man prefers the 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. Notwithstanding 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 las apt for invention,
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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 Explanation.

Here is in Nature no Annihilating, or Reducing to Nothing: therefore that which is consumed is either resolved into Air, or turned into some Body adjacent. So we see a Spider, or Fly, or Ant in Amber, entombed in a more flinty Monument than Kings are, to be laid up for Eternity, although they be but tender things, and soon dissipated; But the matter is this, that there is no air by, into which they should be resolved; and the substance of the Amber is so heterogeneous, that it receives nothing of them. The like we conceive would be if a Stick or 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 Consumpition and Dissolution hath the beginning.

The Explanation.

No Body known unto us here in the upper part of the Earth is without a Spirit, either by Ascension and Conception from the heat of the Heavenly Bodies, or by some other way: for the Concupisencies of Tangible things receive not Vacuum, but either Air, or the proper Spirit of the thing. And this Spirit wherein we speak is not some Virtue, or Energy, or Alt, or a Tride, but plainly a Body, rare and invisible; notwithstanding circumscribed by Place, Quantitative, Real. Neither again is that Spirit Air, (no more than Wine is Water) but a body 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 it is able to digest, into new Spirit: and then as well the pre-existing Spirit of the body as that newly made flee away together by degrees. This is best seen by the Diminution of the weight in bodies dried through Perforation: for neither which is issified forth was Spirit when the body was ponderous, neither was it not when it issified forth.

Canon III.

The Spirit issifying forth Drieth; Detained and working within either Meleth, or Patretheth, or Vivilixth.

The Explanation.

There are four Processes of the Spirit, to Arefalion, to Colligation, Patre-fallion, to Generation of bodies. Arefalion is not the proper work of the Spirit, but of the grosser parts after the Spirit issified forth: for then they contract themselves partly by their flight of Vacuum, partly by the union of the Homogentals: as appears in all things which are arified by age, and in the drier sort of bodies which have passed 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 dispose themselves among the grosser parts, and so make them soft and apt to run, as it is in Metals and wax: for Metals and all tenacious things are apt to inhibit the spirit, that being excited
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Excited it issueth not forth. Putrefaction is a mixed work of the Spirits and of the groffer parts: for the Spirit (which before restrained and bridled the parts of the thing) being partly issueth forth and partly infected, all things in the body do dissolve and return to their Homogeneity, 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 flipperiness and unquietness; the Water parts also to themselves: the Dry to themselves: whence followeth that confusion in bodies putrefied. But Generation or Vivification is a work also mixed of the Spirit and groffer parts, but in a far different manner: for the Spirit is totally detained, but it liveth and moveth locally: and the groffer 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 Organisation: 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 cohesion 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, ease to yield.

Canon IV.

In all living Creatures there are two kinds of Spirits: Livelefs Spirits, such as are in bodies Inanimate; and a Vital Spirit superadded.

The Explanation.

It was said before, that to procure long life the Body of man must be considered, first, as Inanimate, and not repaired by nourishment: secondly, as Animate, and repaired by nourishment: for the former consideration gives Laws touching Consumption, the latter touching Reparation. Therefore we must know that there are in humane flesh bones, membranes, Organs: finally, in all the parts such spirits diffused in the substance of them while they are alive, as there are in the same things (Flesh, Bones, Membranes, and the rest) separated and dead: such as also remain in a Carkass: but the Vital Spirit, although it ruleth them, and hath some content with them, yet it is far differing from them, being integral, and subsisting by it self. Now there are two special differences between the Livelefs Spirits and the Vital Spirits. The one, that the Livelefs 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 Frost: but the Vital Spirit is all continued to itself by certain Conduit-pipes through which it passeth, and is not totally intercepted. And this Spirit is two-fold also: the one branched, only passing through small pipes, and, as it were, ftrings: the other hath a Cell also, so as it is not only continued to itself, but also congregated in a 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 part of creatures are but narrow, in so much that the spirits in them seem scattered over their whole body rather than Celled; as may be seen in Serpents, Eels and Fitches, whereof every one of their parts move long after they are cut affunder. Birds also keep a good while after they are killed, because they have little heads and little Cells. But the nobler sort in Creatures have those Ventricles larger, and Man the largest of all. The other difference between 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 miniftreth peculiar motions and faculties: 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 first flame, as of Spirit of Wine, 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 Aerous nature.

Canon V.

The Natural Actions are proper to the several Parts, but it is the Vital Spirit that excites and sharpens them.
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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, Peristaltion, even Sense it self) according to the propriety of the several organs, (the Stomach, Liver, Heart, Spleen, Gall, Brain, Eye, Ear, and the rest:)

yet none of these Actions would ever have been actuated but by the vigour and presence of the Vital Spirit and heat thereof: as one Iron would not have drawn another iron, unless it had been excited by the Lead Stone, nor an Egg would ever have brought forth a Bird, unless the Substantia of the Hen had been actuated by the treading of the Cock.

Canon VI.

The liveloss Spirits are next Consubstantial to Air; the vital Spirits approach more to the Substantia 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 laid in the Canon, that the vital Spirit approach more to the Substantia of Flame; it must be understood, that they do this more than the liveloss Spirits, not that they are more Flamel than Air.

Canon VII.

The Spirit hath two Desires; one of multiplying itself, the other of flying forth and congregating itself with the Cunnaturals.

The Explanation.

The Canon is understood of the liveloss spirits; for as for the second Desire, the vital Spirit doth most of all abhor flying forth of the body, for it finds no Cunnatural 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, it abhorreth. But in the liveloss Spirits each of these two Desires holdeth. For to the former this belongeth, Every Spirit seateth amongst the groser parts, dwelleth unhappily; and therefore when it finds not a like unto it self, it doth so much the more labour to create and make a like, as being in a great solitude, and endeavour earnestly to multiply it self, and to prey upon the volatile of the groser parts, that it may be increased in quantity. As for the second Desire of flying forth, and becking it self to the Air, it is certain that all light things (which are ever movable) 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 spirits into the Air ambient, because it is not carried to a particle like unto it self, but also as unto the Globe of the Cunnaturals. 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 appetit of the Spirit, partly out of the appetit of the air; for the common air is a needy thing, and receiveth all things speedily, as Spirits, Odours, Beams, Sounds, and the like.

Canon VIII.

Spirit detained, is it have no possibility of begetting new spirits, itnerateeth the groser parts.

The Explanation.

Generation of new Spirits is not accomplished but upon those things which are in some degree near to spirits, such as are humid bodies. And therefore if the groser parts (amongst which the Spirit converseth) be in a remote degree, although the spirit cannot convert them, yet (as much as it can) it weakeneth, and losethem, and subdueth them, that seeing it cannot increace in quantity, yet it will dwell more at large, and live amongst good neighbours and friends. Now this Appearance is most useful to our End, because it tendeth to the Intercration of the obstinate parts by the detention of the spirit.

Canon IX.

The Intercration of the harder parts cometh to good effect, when the Spirit neither flyeth forth, nor begettesth new Spirit.
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The Explication.

This Canon solveth the knot and difficulty in the Operation of Intenetering by the Detention of the Spirit: for if the Spirit not flying forth wasteth all within, there is nothing gotten to the intertenation of the parts in their subsistence, but rather they are dissolved and corrupted. Therefore together with the Detention the Spirits ought to be cooled and restrained, that they may not be too active.

Canon X.

The heat of the Spirit to keep the body fresh and green, ought to be Robust, not Eager.

The Explication.

Also this Canon pertaineth to the solving of the knot aforesaid, but it is of a much larger extent, for it setteth down of what temperament the heat in the body ought to be for the obtaining of Long life. Now this is useful, whether the Spirit 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 Defeates, the other intertemereth. Besides, the same thing is available to the well perfecting of Affimation; for such an heat doth excellently excite the faculty of Affimation, and withall doth excellently prepare the matter to be Affimated. Now the properties of this kind of heat ought to be these. First, that it be flow, 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 resit it, it be not easilly suffocated or languish. This operation is exceeding subtil, but seeing it is one of the most useful, it is not to be defected. Now in those Remedies which we propounded to infetl the spirits with a robust heat, or that which we call Operative, not Preatory, we have in some sort satisfieth 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 condendeth 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 raiseth more to flying forth, and preyseth upon the body more, than in small quantity.

The Explication.

This Canon is clear of it self, seeing mere 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 Preparation.

Canon XIII.

The Spirit equally disperseth maketh least haste 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 infused by small portions, the less it preyeth; for Dissolution ever beginneth at that part where the Spirit is looser. And therefore both Exercise and Frications conduceth 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 Consumption is considered, but the Repara-
Reparation, and Reparation proceedeth by the Appetites of things, and Appetite is sharpened by variety) it holdeth not rigorously; but it is so far forth to be received; that this variety be rather an alternation or entrechance than a confusion, and as it were constant in insconstancy.

Canon XV.

The Spirit in a Body of a solid compositure is detained, though unwillingly.

The Explanation.

All things do abhor a Solution of their Continuity, but yet in proportion to their Diversity or Rarity: for the more rare the bodies be, the more do they suffer themselves to be thruf 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 discontinued, or he driven into over-straight pores and passages: and therefore if the spirit be encompassed with a hard body, or cleft with a vitrious 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 excuted by the fire, or the grosser parts be differeved with corrodning and strong waters. The like reason is there of tenacious bodies, such as are Gums, save only that they are melted by a more gentle heat: and therefore the juices of the body hard, a clofe and compact skin, and the like, (which are procured by the drujes of the Aliment, and by Exercise, and by the coldnefs of the air) are good for long life, because they detain the spirit in clofe prifon 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 irriteted by the antipathy of the body enclosing it, nor fed by the over much likeness 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 preffing upon the spirits as hard bodies, nor so near as watery bodies, neither have they any good agreement with the air ambient.

Canon XVII.

The speedy flying forth of the Watery humor conserves the Oily the longer in his being.

The Explanation.

We said before that the Watery humors, as being confubstantial to the Air, fell forth (concealing the oily later) as having small agreement with the Air. Now whereas these two humors are in moist bodies, it comes to past that the Watery doth in a fort betray the oily, for that influing forth infensibly carrieth this together with it. Therefore there is nothing more furthereth the conservation of bodies than a gentle drying of them, which caufeth the Watery humors to expire, and invecteth not the Oily; for then the oily enjoyeth the proper nature. And this tendeth not onely to the inhibiting of Putrefaction, (though that also followeth) but to the conservation of Greenness. Hence it is, that gentle Frictions and moderate Exercise, caufing rather Perpiration than Sweating, conduces much to long life.

Canon XVIII.

Air excluded confereth 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 inferted into an old Body might soon turn Nature's course back again.
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The Exposition.

The nature of the spirits is as the uppermost soul, which turns about the other wheels in the body of man, and therefore in the Intention of Long life, that ought to be first placed. Hereunto may be added, that there is an easier and more expedite way to alter the spirits, than to other Operations. For the Operation upon the spirits is two-fold: the one by Aliments, which is slow, and, as it were, about; the other, (and that two-fold) which is sudden, and goeth directly to the spirits, namely, by Vapours, or by the Affections.

Canon XX.

Juices of the Body hard and rofied are good for Long life.

The Exposition.

The reason is plain, seeing we shewed before, that hard things, and all or rofied are hardly dissipated: notwithstanding there is difference, (as we also noted in the tenth Operation) That juice somewhat hard is indeed less dissippable, but then it is withal less reparable; therefore a convenience is interlaced with an inconvenience, and for this cause no wonderful matter will be achieved by this. But rofied juice will admit both operations; therefore this would be principally endeavoured.

Canon XXI.

Vaporous is of thin parts to penetrate, and yet hath no Acrimony to bit, begeteth Roised Juices.

The Exposition.

This Canon is more hard to practise than to understand. For it is manifest, whatever penetrate well, but yet with a sting or tooth, (as do all sharp and four things) it leaveth behind it wheresoever it goeth some mark or print of drainess and closing so that it hardneth the juices, and chappeth the parts: contrarily, whatsoever things penetrate through their innerness merely, as it were by health, and by way of inflammation, without violence, they brisk 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 Exposition.

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 Exposition.

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 Influxions) require no long time. And therefore Alimenation 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 Nutritions, by Baking, Unions, or else by Clysters, the parts 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 Exposition.

That which is propounded in this Canon is not the same thing with the former; for it is one thing for the outward Aliment to be attracted inward, another for the inward Aliment to be attracted outward: yet herein they concur, that they both help the weaknes of the inward Concoction, though by divers ways.

Canon XXV.

All sudden Renovation of the Body is wrought either by the Spirit, or by Malacifications.

The Exposition.

Here 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 onely to make them more fit to be nourished.

Canon
Chapter XXVI.

Malacification is wrought by Consubstantials, by Imprinters, and by Clozers up.

The Explanation.

The reason is manifest, for that Consubstantials do properly supple the body, Imprinters do carry in. Clozers up do retain and bridle the Perpiration, 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 Liqueur by Thickners: for an outward and gross Infusion doth not well compact the body: that which entreteth must be subtil, and a kind of vapour. Secondly, by Intenration by the content of Consubstantials: for bodies upon the touch of those things which have good agreement with them, open themselves, and relax their pores. Thirdly, Imprinters are Convoices, and intimate into the parts the Consubstantials, and the mixture of gentle Strenuities doth somewhat restrain the Perpiration. But then, in the fourth place, follows that great Aversion and Close upon the body by Emplasification, and then afterward by Imnuration, until the Supple be turned into Solid, as we laid in the proper place.

Chapter XXVII.

Repairable Renovation of the Parts Repairable watereth and reneweth the left Repairable also.

The Explanation.

We said in the Preface to this History, that the way of Death was this: That the Parts Repairable died in the fellowship of the Parts left Repairable: so that in the Repairation of these same left Repairable Parts all our forces would be employed. And therefore being admonished by Aristotle's observation touching Plants, namely, That the putting forth of new leaves and branches refasheth 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 Repairable, partly by the cheerful passage of the juices, partly by that new cloathing of the young flesh and blood, might be watered and renewed.

Chapter XXVIII.

Refriguration or Cooling of the body, which passeth some other ways than by the Stomach, is useful for Long life.

The Explanation.

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.

Chapter XXIX.

That Intermixing or Intangling, that as well Consummation as Reparation are the works of Heat, is the greatest obstacle to Long life.

The Explanation.

Almost all great works are destroyed by the Nature of things Intermixed, whereas that which helpeeth in one respect hurgeth 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 beasts from hurtful, and the remedies which tend to both.

Chapter XXX.

Curing of Diseases is effected by temporary Medicines; but Lengthening of Life required Observation of Diets.

The Explanation.

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 Diet, 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 shall
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shall find only three set 'Diets, the Opiate Diet, the Diet Malacifant or Supping, and the Diet Enratic and Renewing. But amongst those which we preferred for Familiar Diet, and to be used daily, the most efficacious are those that follow, which also, come not far short of the virtue of Set Diets: Nitre and the subordinates to Nitre; the Regiment of the Affections and Course of our Life; Refrigerantours which palls not by the Stomach; Drinks Restoring, or inguirding oily juices; besprinkling of the blood with some former Matter, as Pearls, certain woods, competent Venoms to keep out the Air, and to keep in the Spirit: Heaters from without, during the Affimation after sleep; avoiding of those things which inflame the Spirit, and put it into an eager heat, as wines and spices; lastly, a moderate and seafonable use of those things which endure the Spirits with a robust Heat, as Saffron, Cresses, Garlic, Elecampane, and compound Opiates.

Canon XXXI.

The Living Spirit is instantly extinguished if it be deprived either of Motion, or of Refrigeration, or of Aliment.

The Explication.

Namely, these are those three which before we called the Parts of Death, and they are the proper and immediate passions of the Spirit. For all the organs of the principal parts serve hereunto, that these three Offices be performed; and again, all destruction of the organ which is deadly brings the matter to this point, that one or more of these three fail. Therefore all other things are the divers ways to Death, but they end in these three. Now the whole Fabric of the Parts is the organ of the Spirit; as the spirit is the organ of the Reasonable Soul, which is incorruptible and Divine.

Canon XXXII.

Flame is a Momentary Substance, Air a Fixed; the Living Spirit in Creatures is of a middle Nature.

The Explication.

This matter stands in need both of an higher Indagation and of a longer Explication than is pertinent to the present inquisition. Mean-while we must know this, that Flame is almost every moment generated and extinguished; so that it is continued only by successions: 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-operation of the Air whereof we have spoken in the Title De Ventis. But Spirit is participant of both Natures, both of Flame and Air, even as the nourishments thereof are, as well Oil, which is homogeneus to Flame, as Water, which is homogeneus to Air: for the Spirit is not nourished either of Oily alone, or of Water alone, but of both together; and though Air doth not agree well with Flame, nor Oil with Water, yet in a mix'd body they agree well enough. Also the Spirit hath from the Air his easy and delicate impressions and yeldings, and from the Flame his noble and potent motions and activities. In like manner, the Duration of Spirit is a mix'd thing, being neither so momentary as that of Flame, nor so fix'd as that of Air: and so much the rather it followed not the condition of Flame, for that Flame itself is extinguished by accident, namely, by Contraries and Enemies envir-omning 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 injected into the Brain; but this Reparation is done by a peculiar manner, of which we speak not now.

FINIS.